An Assessment of the Problem of Vervet Monkeys in the Former Westville Borough: Management Implications

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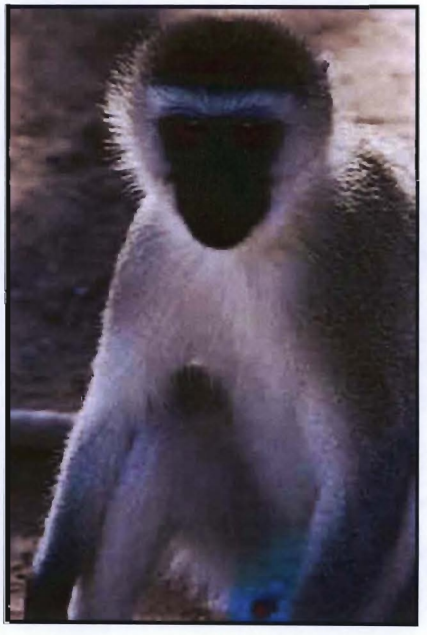
Submitted in fulfilment of the academic requirements for the degree of Master of Science in the school of Environmental Sciences, University of KwaZulu – Natal



December
2005

Dedicated to…

my family for being exceptionally wonderful.

Truly man is the king of beasts, for his brutality exceeds them. We live by the death of others. We are burial places! I have from an early age abjured the use of meat, and the time will come when [humans] such as I will look upon the murder of animals as they now look on the murder of men.

Leonardo Da Vinci

ABSTRACT

Urbanisation, a process occurring at an excessive rate per annum, has implications for the natural environment that are vast and varied. One of the most significant is the effect on natural habitats, shaped by habitat destruction and modification. The simplification of ecosystems, homogenisation of landscapes and influence on keystone species are a few impacts on indigenous fauna existing in these habitats. Some species are unable to withstand external disturbances, while other species are more adaptable, and often thrive in these modified, and now optimal, environments. Increasingly, provisions are made to accommodate nature in an urbanising world with tools like *Impact Assessments* and *Opens Space Systems*. These procedures however, do little to specifically protect indigenous fauna, progressively categorised as "problem animals" or vermin, like monkeys, which often bear the brunt of attacks by humans who see them as a nuisance and a threat to their well-being.

The study therefore aimed to "Assess the nature and extent of the *monkey problem* in the former Westville Borough", a suburb in the city of Durban, South Africa. Questionnaires administered to residents and interviews done with stakeholders documented their views on the "monkey problem," and the effectiveness of proposed solutions in alleviating these problems. Using orthographic photographs, illustrating land-use change, the rate and nature of habitat destruction experienced in the former Westville Borough between 1974 and 2001 was assessed. Records of injuries to monkeys held by the Centre for Rehabilitation of Wildlife (CROW), along with letters of complaint regarding monkeys in local newspapers, were collected to assess the nature and frequency of the problem.

Resident's opinions implied that the threat of Vervet Monkeys was more perceived then real. Eighty three percent thought monkeys were not a threat to humans. Education and awareness campaigns were thought to be successful in alleviating the problem by 86% of residents and 100% of interviewees.

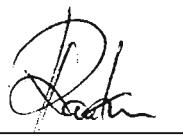
Residents believed that "everyone" should be responsible for the problem while interviewees were divided in opinion but placed most responsibility on local government. An assessment of land-use changed showed a decrease of over 15% in open space provision over a twenty six year period. CROW records showed that the majority of monkey injuries were due to assault or shooting and most often to males between the months of April and July.

Conclusions based on the findings of the study emphasise the need for stronger legislation specifically for Vervets and detailed guidelines on both management of and responsibility for the monkeys, with less shifting of blame by stakeholders and authorities. The implementation of education and awareness programs were also advocated, to educate the public on the problem and their role in protecting one of Africa's most valuable assets.

PREFACE

The experimental work described in this dissertation was carried out in the School of Environmental Sciences, University of KwaZulu – Natal, from January 2003 to December 2005, under the supervision of Dr. Helen K. Watson.

These studies represent original work by the author and have not otherwise been submitted in any form for any degree or diploma to any University. Where use has been made of the work of others it is duly acknowledged in the text.



Y Ramkissoon (Candidate)

29 MARCH 2006

Date

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The Centre for the Rehabilitation of Wildlife (CROW) for allowing me access to records. Also thanks to Dianne for assisting me with recording telephone calls.

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CHAPTER ONE
INTRODUCTION

1.1. Introduction

Most research embarked on by academics is motivated by a desire to contribute to a greater understanding of an issue or describe and explain a phenomenon. Sometimes it is because the researcher has personal desire to understand a specific problem and in turn alter perceptions or attitudes (Kitchin & Tate, 2000). This introduction chapter will present as the motivation for this study, the plight of the problem animal, particularly the South African Vervet Monkey. The aims and objectives will be outlined followed by the structure of the dissertation and a brief summary of each chapter in conclusion.

1.2. Motivation for Study

"*Within the last two hundred years, human beings have transformed the globe, drastically altering its land, water, atmosphere and life*," (Brown, 1989: 85). Activities like the conversion of natural open space to agricultural fields and the subsequent transformation to dense urban environments, has affected natural systems in ways that we are just beginning to understand.

Since the development of the first cities some 27 000 years ago, urbanisation has continued to rise at a steady pace, having accelerated with the onset of the industrial revolution in the late eighteenth century. Currently, the world urbanisation rate of is an excessive 2.09 percent per annum. By the year 2007, the world's urban population is set to equal its rural population and by 2030 should well surpass it (United Nations Population Division (UNDP), 2004).

While urbanisation continues unchecked, the associated impacts on the natural environment are mostly ignored. The quantity of land required to house the growing urban population results in wide scale deforestation, habitat destruction and habitat fragmentation. In turn, habitat destruction impacts on communities and ecosystems housed within these habitats, which are then eradicated. In the case of habitat fragmentation, the less hurried conversion of forest lands to agricultural lands is by – passed as the land is converted directly to a built up urban environment. This process causes exceeding instability, due to factors like decreased resilience, edge effects, containment and interbreeding, within an ecosystem or once thriving community (Thompson, 2001). The natural processes are rushed to a point were some faunal and floral species are unable to cope, struggle for survival and with dwindling numbers become endangered or extinct. Other species, however, find these newly modified environments optimal and begin to thrive. This usually occurs for various reasons including the absence of natural predators, a year round food supply or the alteration of the natural selection process for that animal.

The problem for animals that survive is the resulting interaction with humans that ensues due to a restricted habitat enclosed by dense residential development. History has shown a rather bleak relationship between animals and humans, which does not bode well for animals in constant contact with humans. The relationship between humans and nature can be best described as dualistic. Historically, while humans have revered and worshiped animals and simultaneously treated them with irreverence and aggression, through confinement, hunting, violent animal sports and abuse.

In light of the effects of urbanisation on the natural environment, a resistance to unsustainable development resulted in the twentieth century with an increase in environmental research and the development of urban ecology, environmental associations, and importantly the principle of sustainable development.

Sustainable development is defined as "*development that meets the needs of present generations without compromising the ability of future generations to meet their needs*" (WCED, 1987: 8). Informed by this principle, tools were developed to ensure that the provision for urban open space would be in the future catered for and that development would consider the impacts of growth on the environment.

Two such tools utilised in South Africa for this purpose are Environmental Impact Assessments (EIA) and the Metropolitan Open Space System (MOSS). EIA's were designed to identify potential impacts to the natural and social environment, by a process of specialist studies and public participation, and attempt to mitigate these impacts so that the development was more sustainable. MOSS, termed D'MOSS for Durban, the city within which this study was conducted, was designed to compensate for the loss of open space in an urban area by preserving pockets of land within the city and linking them to each other, thereby creating an open space system. These reserves would then employ the use of buffers around them to minimise the impacts of surrounding areas. Although rigorous in theory, these tools have not assisted in curbing the hostility between humans and Vervet Monkeys in Durban. Outlined extensively in the literature review in chapter two, an EIA in short does not provide explicitly for indigenous wildlife, just certain patches of wildlife habitat. And D'MOSS has failed to secure a sufficient open space system and take into account sound ecological planning with corridors and buffers for wildlife habitation.

Vervet Monkeys are subtropical semi – terrestrial mammals, placed in the order primates, the same as humans. Their high level of adaptability, due to their ability to survive in a variety of habitats, has made then enduring and highly persistent, especially in urban areas were they are regularly in human contact. To access food and water, monkeys have made a habit of searching residential properties, entering gardens and homes and often reeking havoc in these areas by messing gardens and homes, stealing food that is visible to them and sometimes causing damage to property.

Residents are mostly tolerant of monkeys, recognising them as just a nuisance, but some perceive the monkeys as more than a nuisance and feel threatened by their presence. For this reason humans become hostile towards them and sometimes even militant as they attempt to rid themselves of the problem in ways such as shooting, trapping or poisoning monkeys. While monkeys are designated as *vermin* in rural areas allowing farmers to kill them if they enter rural properties, their status in a residential area is at present undefined and vague and currently under review. The only law available to prosecute offenders who injure or kill wildlife is therefore the charge of "discharging a firearm in a public area."

Clearly, protection for indigenous wildlife is lacking and the law is tilted in favour of offenders. There is therefore a need for research into the problem and for the development of management guidelines for monkeys to ensure that people in residential areas do not feel threatened by their presence and that Vervet Monkeys are afforded protection worthy of indigenous wildlife that play an integral part in shaping our African landscape.

1.3. Aim

The aim of the study based on the conflict between Vervet Monkeys and humans was therefore:

"To assess the nature and extent of the *monkey problem* in the former Westville Borough"

The motivation for choosing this particular study area, the Westville Borough of Durban, is provided in chapter four of this dissertation.

1.4. Objectives

The objectives formulated to assess the nature, extent and the potential cause of and solution to the problem.

- To categorise and quantify land-use changes (1974 – 2000)
- To profile the frequency and nature of complaints
- To assess, if any, the association between land-use changes and incidence of monkey complaints
- To examine Durban's EIA and MOSS processes and establish if provision for indigenous fauna exist

1.5. Structure of Dissertation

A brief description of each chapter of this dissertation is presented below. The chapters were arranged mostly according to the order in which they were researched beginning with the theoretical aspects of the dissertation and moving on to the practical components of data collection followed by a merging of both to conclude.

1.5.1. Literature Review

The second chapter of this dissertation traces a lengthy and extensive background leading up to the problem of conflict between humans and wildlife in an urban area. It begins with a review of urbanisation trends and projections followed by a history of the development of the city and the conflicting relationship between humans and nature. An examination of the effects of habitat destruction and fragmentation on the natural environment ensues.

A review of why conservation is necessary, including motivations for conservation, like the physical, psychological and educational benefits are also included. The chapter proceeds with the appraisal of two systems put in place by national and local government in an attempt to mitigate the impacts of development on the environment, Environmental Impact Assessments and the Metropolitan Open Space System, and concludes with a description of problem animals and potential solutions to the conflict between humans and urban wildlife.

1.5.2. Vervet Monkeys in South Africa

Chapter three of the dissertation narrows the focus of problem animals down to the plight of the Vervet Monkey in South Africa. The system in place for the preservation of habitat for wildlife, Environmental Services Management Plan, is highlighted, within the context of the city of Durban. Background information of the Vervet is then provided, including a description of the formal taxonomy of the Vervet Monkey tracing its classification from family to species to sub species. This is followed by a basic description of the monkey's natural habitat and of the monkey itself. The status of the Vervet Monkey is then examined, listing the status of the monkeys in different provinces before focusing on the South African province of KwaZulu-Natal, particularly the draft policy for the management of Vervet Monkey, prepared by Ezemvelo KwaZulu-Natal wildlife, the provincial government wildlife authority.

1.5.3. Study Area

Chapter three considers the study area chosen for this dissertation, namely the former Westville Borough, Durban based in the province of KwaZulu-Natal. The study area was chosen using various criteria and this chapter describes these criteria. The chapter follows with a basic description of the city of Durban (eThekwini Municipality) and then narrows the focus down to the suburb of Westville and the two major reserves within the area, the Palmiet and Roosfontein Nature Reserves.

1.5.4. Methodology

The data collection process of the study was rigorous and multi pronged. Chapter five reviews the methodology used for the study beginning with a background of the philosophy which informed this research project and a description of different forms of data collection and different types of data. The chapter than describes the applicability of each data collection method and the actual procedure followed to gather the data. The process included the administration of questionnaires and interviews, the assessment of land-use change using orthographic photography, the collection of records from CROW and the collection of articles and letters from the newspaper the *Highway* Mail. It concludes with a description of the strengths and weaknesses of the process in its entirety.

1.5.5. Results

The data collected through the various processes described in the methodology chapter were analysed and the results are presented in chapter six. The results are coded and converted to percentages for easy presentation and comparison, while interviews scrutinised further for more in depth explanations and information. The chapter concludes with the results of calculations done to assess the relationship between various demographic and site survey data with the monkey problem.

1.5.6. Discussion

The discussion chapter seeks to tie up the results presented in chapter six to form a more collated form. The chapter is divided into a few significant headings and links the different sets of data that go together to support and underpin a point. It is hoped that the discussion chapter would be succinct and identify patters that allow informed recommendations to be made.

1.5.7. Conclusion and Recommendations

The concluding chapter of the dissertation aims to summarise the findings of the dissertation by assessing of the aims and the objectives described in the introduction were met and to provide a few recommendations based on the findings of the dissertation.

1.6. Conclusion

This introduction chapter sought to put into context the plight of monkeys as problem animals in an urban area by providing a brief history of urbanisation and the historical conflict between humans and animals. Using this as a motivation for the study, the aims and objectives were listed. The chapter concluded with a brief outline of the dissertation and the focus of each chapter. Chapter two, the literature review will elaborate on the theories presented as the motivation for this study.

CHAPTER TWO
LITERATURE REVIEW

2.1. Introduction

Since the beginning of the first settlements of people, humans have modified their surrounding environment, often with no regard for the consequences thereof. Activities such as the transformation of natural open space into cities, suburbs and other built areas have altered the distribution and abundance of plants and animals, and humans are just beginning to feel and understand the consequences thereof.

Environmental Branch, Development and Planning Service Unit (EB: DPSU) (1999: 3) defines natural open spaces as a "*remaining undisturbed natural and undeveloped area.*" For the purpose of this dissertation, natural open space is similarly defined. Urbanisation and the ensuing destruction or modification of natural open space has resulted in the near extinction of many animal species due to the loss of their natural habitat or their inability to withstand pressure from environmental changes. Others species adapt to an urban lifestyle and human – wildlife interactions are common occurrences in urban environments, which are otherwise characterised by their distance from *nature* and the *countryside.* These interactions often led to conflict, as many people see wildlife in the city as a threat to their well-being. The wildlife concerned then attains the status of *problem animal* or *vermin.*

A growing concern is that, with the continued increase in the world's human population, there will be an inevitable increase in urbanisation. Estimates show that over sixty percent of the world's population will be urban dwellers by the year 2030 (United Nations Population Division (UNDP), 2001). If habitat destruction and modification continue unchecked, human – wildlife interactions are likely to increase and conflict situations likely to follow. This thesis argues that the onus is on the city management authority to make provision for resident fauna prior to development, and where development is complete, to implement measures to decrease conflict and protect wildlife.

This chapter seeks to put into perspective the plight of the *problem animal*. It begins with a look at a city, its definition and the main elements that constitute an urban environment. Urban growth rates are considered to illustrate the problem of habitat destruction. The historical developments of urban areas, in relation to nature and animals are examined, beginning from of the first city-like settlements. The resultant environmental pressures are explained, as an overview of the implications of urbanisation and the cause of animal – human conflicts. The effects of habitat destruction and habitat fragmentation are also outlined, highlighting grounds for conservation.

The chapter also reviews Urban Ecology, including a motivation for conservation. Two widely used conservation tools are reviewed, the Metropolitan Open Space System (MOSS) and Environmental Impact Assessments (EIA). These are used as tools for mitigating the effects of development that results in wide-scale habitat loss and environmental degradation.

Finally, the plight of the problem animal is addressed. An explanation is provided for the term *problem animal* followed by methods used by both official authorities and the public in controlling these animals. A case study of problem cougars in the United States is also presented to illustrate difficulties with and lessons learned from dealing with problem animals.

2.2. The Urban Environment

2.2.1. What is a City?

Defining the term *city* is particularly difficult as classifications vary across administrative and national boundaries (Frey & Zimmer, 2000). The meaning of a city also varies between people as their experiences of a city differ widely, which in essence is due to the diversity and contrast of an urban environment.

An urban area is commonly defined according to "*ecological*" factors (Frey & Zimmer, 2000). These include factors such as the size of the city and the size or density of the population.

Thorns (2002: 2), using similar criteria defines a city as, "*concentrations of many people located close together for residential and productive purposes.*" Discrepancies arise from this criterion, however, as the numbers required to constitute an urban area differ between countries.

"*Economic*" factors are also used to define an urban area, where the function and activities of an urban area, usually organised around non – agricultural production, are considered (Frey & Zimmer, 2000). The concentration of a number of diverse services and functions in an area is an indicator of great economic activity and an indicator of an urban environment. In addition to production and service provision, educational, political, administrative and social related activities should also be functioning (Frey & Zimmer, 2000). This definition does not necessarily relate to the concentration of people, because a trend in urban areas is the centralisation of services and economic activity but the decentralisation of residential areas (i.e. suburbs). In this case, the core area of economic activity is referred to as a the *metropolitan* area.

"*Social*" factors can also be used, which are more subjective and describe the social characteristics of an urban environment, both positive and negative. Positive characteristics could be entertainment and service provision like electricity in some cases. Negatives could include crime and isolation. These also differ considerably between countries and individuals who perceive a city in different ways.

The factors described above, with the exception of population size and density, are very difficult to measure. A city is constantly evolving and the boundaries and economic activity are often fluid and irregular. Roberts (1990) questions over particularised definitions of a city and stresses that a factor like congestion is an accidental character of a city, not an essential one. Massey *et al.* (1999) add that many characteristics, such as services and crime, used in defining cities are not exclusive to cities while Tuan (1978: 1) sums up the argument by stating that, "*it is futile to seek a definition of the city that commands universal assent. We ask different questions and necessarily arrive at different answers.*"

In essence, a city perhaps contains a unique blend of these characteristics. Thorns (2002: 2) agrees, explaining that "*cities are not just places of large numbers of people but are also political and legal entities, usually places of local government and economic activity and sites of leisure and recreational activity.*" A city nevertheless, remains an artefact created by humans. The expression *unnatural landscape* is a distinguishing factor, mentioned in all descriptions provided, and a city is often defined by its distance from nature or the countryside. As Roberts (1990: 2) states, "*In the urban environment, men exercise their power to select from the world of nature only those ingredients which they find agreeable in their daily lives, while keeping the remainder at a distance.*" This policy of exclusion and modification of nature and the exercise of authority or dominion over the biophysical environment is the basis of various problems dealt with in most of this dissertation.

2.2.2. Urbanisation Projections

"*We are fast approaching a unique point in human history. Within five years, half the earth's population will live in cities. By 2006, we will be a predominantly urban species*" (Box, 2003: 56).

According to Clarke (1998), fewer than three percent of the world's population lived in urban areas in the year 1800. But a stable food supply in urban areas, migration, colonialism, the Industrial Revolution and improvements in transport and communication systems contributed to a steep rise in urban populations. An estimate of the world urban population for the year 2000 stood at approximately three billion, a figure predicted to rise to almost five billion by the year 2030 (see Figure 2.1) (UNPD, 2004). The urban population, which was approximately thirty percent of the world population in 1950, is set to rise to sixty percent by 2030 (see Figure 2.2). By 2007, the world's urban population should equal the rural population and well surpass it by 2030 (see Figure 2.1) (UNPD, 2004). In addition, almost all of the growth expected in the world population post 2000, will be concentrated in urban areas.

More developed countries (MCDs) should have approximately eighty percent of their total population settled in urban areas, while less developed countries (LCDs) should see almost sixty percent of their population in the same situation.

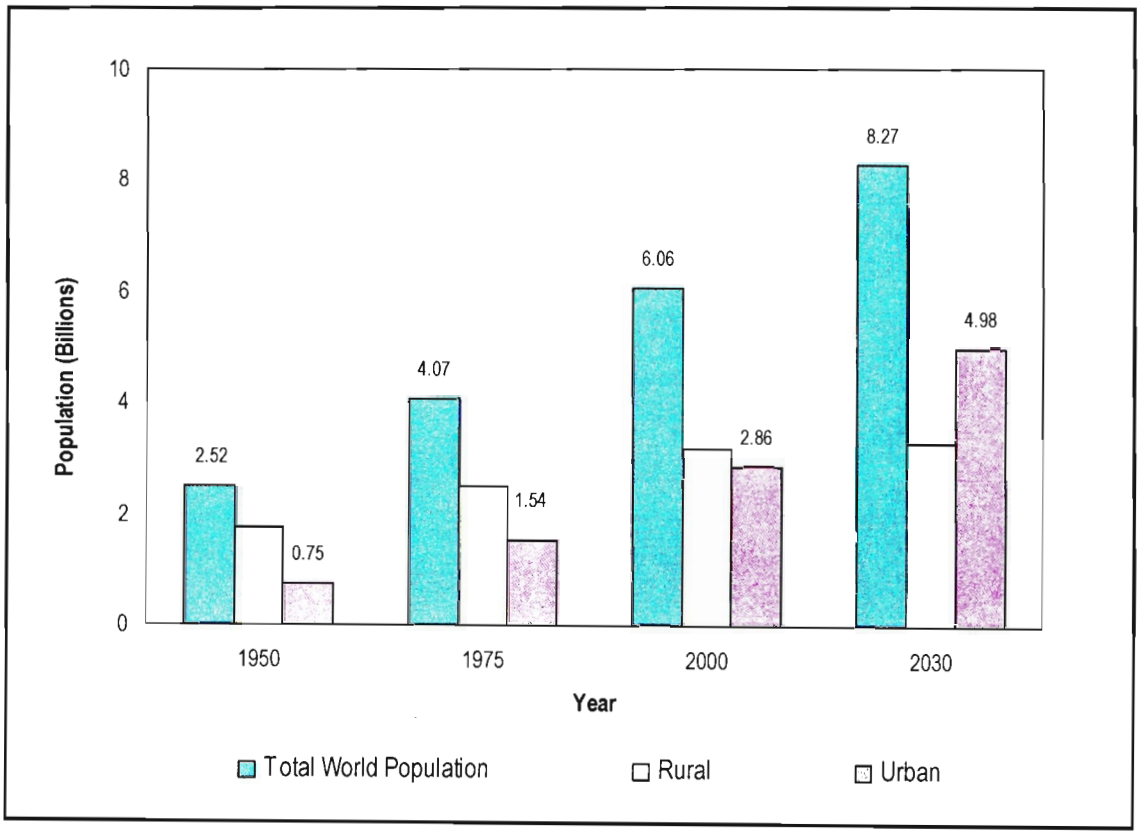

Figure 2.1: Total, Urban and Rural Population Figures (1950 - 2030) (UNPD, 2004)

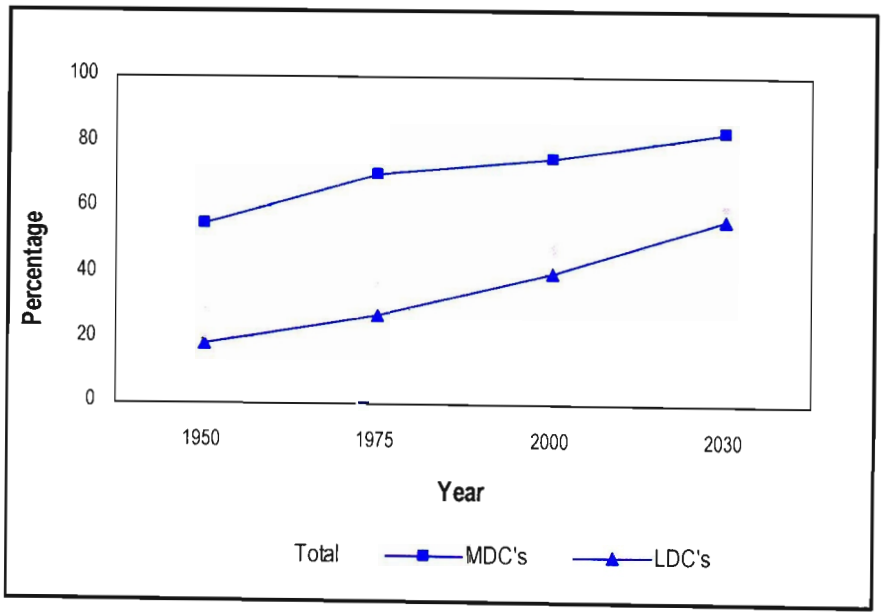

Figure 2.2: Urban Population for the World, MCDs and LCDs (1950 - 2030) (UNPD, 2004)

Also important is the density of these cities. Clarke (1998: 85) explains that "*urban development on this scale is a remarkable geographical phenomenon because instead of being spread widely and thinly across the surface of the habitable earth, the population that is urban is one in which vast numbers of people are clustered together in very small areas.*" In 1800, London was the only city with a population of over one million. Currently there are more that twenty cities worldwide with a population of over ten million and dozens more with a population greater than one million. By 2015, the number of mega – cities (cities with a population greater than ten million) will stand at twenty-one, which is four more than in 2001 (UNPD, 2004). Even these projections seem a bit off base, however, when considering countries that are not listed here, but have rapidly increasing populations, and could enter the realm of mega-cities sooner than predicted. Moya (2004), for example, expects the South African city of Johannesburg to make this list, with an expected population of more than fourteen million by 2015. Many urban specialists predict that the growth of cities will culminate in the development of a universal city referred to as "*Ecumenopolis*" (Roberts, 1990).

The twentieth century was the age of the city. Urbanisation figures rose drastically around the world, and they show no signs of relenting. Therefore, while the prophecy of a universal city seems a bit far-fetched, the world will still soon be an urban place. But what does all this mean for humankind and the environment? An examination of the consequences of "progress" at this rate is required.

2.3. Nature in the City

2.3.1 A History of the City and Nature

Human association with nature varies widely according to perception, and upbringing. This discussion follows the development of cities and their relationship with nature. Particular reference to the European city is made, reason being, a large measure of the colonised world, and South Africa in particular, developed in a similar direction to the European city. South Africa, despite being an African country, saw the development of its cities dictated by European trends (Roberts, 1990).

In addition to an explanation of a human attitude and perception towards fauna and open space, it is also important to explain the human attitude towards flora. The reason is in addition to giving additional insight into the relationship between humans and animals at a particular time, open space was and still is essential to the survival of all fauna. The destruction of natural habitat ensures the destruction of animals. As Coates & Beinart (1995: 24) explain, wildlife loss during hunting heydays was not irreversible if habitat was preserved. "*Hunters and death rates by no means determine the demographic fortune of species. Birth rates conditioned by habitat and adaptability, must be part of the equation.*"

(a) The First Cities

A true understanding of the city can only be achieved once the foundations and beginnings of urbanisation are grasped. It is, however, difficult to pinpoint exactly, the beginning of the process of urbanisation or even the first city, but this is not always necessary. As Mumford (1961: 5: 5) warns, "I*n seeking the origin of the city, one may be too easily tempted to look only for its physical remains.*" Roberts (1990: 5) adds, "*Culture and ethical values have provided the ideological foundations on which urban development has been structured throughout history.*"

While there is much debate and uncertainty surrounding the exact beginning of the first human like creatures, it is thought that approximately by the year 27000 Before Present (BP), the evolution of the species *Homo sapiens* was complete, which guided the start of the modern era (Roberts, 1990). The Palaeolithic Period characterised humans as hunter – gatherers and the use of caves as homes was probably the first modification, which involved the closing out of nature (Mumford, 1961).

The Neolithic period was a significant era in terms of realising a relationship with the land, as it saw the development of humans as "agriculturalists." The advancement of food supply methods, through the cultivation of plants was accomplished. This led to a decrease in movement, as a regular food supply would mean a permanent home (Roberts, 1990).

While the exact time of animal domestication cannot with any degree of certainly be ascertained, it is generally accepted (Hough, 1934; Dyson Jr, 1953) that the establishment of city-like settlements went hand and hand with wide-scale animal domestication. Hough (1934: 146) explains, "*It is evident that man did not domesticate animals until he reached a certain stage of domestication himself.*" While humans, prior to the Neolithic period, might have handled harmless pets, the use of livestock such as goats and sheep were evident during this period with the advent of agriculture. The domestication of pets, like dogs, was also widely noted in this period.

Focus also turned from food availability to other activities like commercial trade, politics and religion. It is thought that the earliest of these kinds of settlements existed approximately 5 500 years ago in Mesopotamia (Iraq), The Nile Valley (Egypt), the Indus Valley (India) and the Hoang – ho Valley (China) (Frey & Zimmer, 2000). Babylon, Patna and Rome were also found to have large concentrations of people (Frey & Zimmer, 2000).

Important in this era, was the beginning of the process of modelling homes, ditching, irrigation and canal building. "*The domestication of the landscape had begun*" (Roberts, 1990: 7). Slowly these small villages evolved into the first cities. Some argue that the foundations of these cities relied on an interplay between the hunter – gatherer era and the agricultural era for a long period. Eventually, the feminine nurturing activity became dominant and settlements were borne (Mumford, 1961). Varying other reasons were suggested by authors, to explain this transformation and some argued that is was actually a result of a "*complex association of factors*" (Roberts, 1990: 7). Either way, settlement and modification was now common.

The ability to produce and store surplus food and the development of writing, social organisation and technology led to what Roberts (1990: 8) terms "*urban implosion.*" In addition, masculinity as the dominant power was again realised and with it came the will to dominate and control all beings (Mumford, 1961). The resulting patriarchal society, preoccupied with war and dominance resulted in a general lack of respect for the natural environment.

People followed only their chieftains and religion, which were therefore "*stewards to someone else's land*" (Roberts, 1990: 9). Moreover, walls that enclosed cities, protecting them from enemies, ultimately served as the first physical barriers between nature and the city. As cities grew, the rectilinear form of development entrenched the division between humans and nature.

The Neolithic Period brought with it formal human settlements and domestication of both the landscape and animals, mainly for agricultural purposes. The following century brought sizeable destruction to the environment and irreverence in the treatment of animals. Where hunting undertaken by indigenous tribes was done mainly for practical reasons, hunting under the Roman and Greek Empires was for sport and status and had devastating consequences.

(b) Antiquity: Greek and Roman Empires

The second century saw the rise of the Greek and Roman Empires. Settlements in these areas grew, while the relationship or contact with nature diminished. Roberts (1990) explains that open spaces in Ancient Greece were confined mostly to Agora, which were manicured and treeless. Their function was not that of aesthetic beauty or spirituality, but rather an area of meeting and trading. The only gardens present in Greek cities were patio gardens or fruit gardens, save the private courtyards of the wealthy.

Roman cities were similar to Greek cities, and like the later stage of Greek planning, the Romans followed a formal urban design. Roberts (1990: 11) describes the Romans as "*primarily engineers, and as such their relation to the natural landscape was in general one of total domination.*" Although open spaces increased in ancient Rome, in the form of private gardens around imperial palaces, these few spaces were not public and were relatively unnatural (i.e. controlled and manicured). In terms of open space advancement, the Greek and Roman Empires made some progress with regard to allowing nature into the city, but these spaces were highly controlled and formal.

In terms of destruction and modification of land resources, antiquities were almost devastating in their effects. Coates (1998) explains that both civilisations were hugely dependent on wood for cooking and heating purposes and therefore relied heavily on forest resources. As the population grew in the fourth and fifth century, extensive land was reclaimed and swamps were drained to both feed and house inhabitants. In addition, waste and household refuse were discharged directly into rivers and streets.

The Greeks viewed wildlife with great dualism and conflict, moving between reverence and worship to distaste and inferiority (Coates, 1998). While Greek deities were often nature or animal based, debates raged on whether or not animals processed souls and were entitled to any rights. And while Greece boasted a few sacred "groves" which were believed to have divine associations, and were off limits for logging or hunting, these areas were few and far between. The majority of animals in Ancient Greece were treated with irreverence and "*killed with impunity*" (Coates, 1998: 31). This dualism occurred also in the case of hunting where Coates (1998: 37) explains, "*The ethical hunter featured in Greek mythology is someone who is respectful of game sanctuaries and who was linked to his prey by a secret bond.*" Artemis the Greek hunting Goddess, for example, persecuted the wild animals with her "*arrows of anguish*" but she was still their friend and protector (Cartmill, 1993: 32). So even thought the "hunt" was often brutal, sometimes incorporating dog driving (cynegia) and often compared with warfare, it was still considered an art. Hunting in Greece was originally practised for practical reasons, generally for consumption rather than sport. The emergence of the Greek aristocracy, however, made hunting a prerequisite of the elite (Mackenzie, 1988). Practical hunting of townsmen was prohibited to in order to preserve game for the significant sport of the upper-class men.

Romans, like Greeks were conflicting in the view of fauna. While animals were revered in terms of Roman mythology, the presence of a soul in an animal or their intrinsic value was denied (Cartmill, 1993). And while Romulus and Remus, the twin boys which according to legend founded Rome, were nurtured by a holy and sacred wolf, wolves were in reality severely persecuted throughout Roman history (Coates, 1998).

While the Greeks placed great traditional significance on hunting, it was not a traditional pastime for the Romans (Cartmill, 1993). Hunting was originally a chore for farmers slaughtering animals like rats and hogs. Like the Greeks, however, it soon became a chief sport of the elite and animals were slaughtered to demonstrate man's dominance over beasts and also symbolising man's subjugation over his enemies. In addition to hunting, games severely exploiting animals, which are synonymous with the Romans, took place from 2500 BP onwards, in numerous cities in Rome. These games were spectacles of great importance in their society, designed to entertain the masses and enforce imperial power (Cartmill, 1993).

If the Greeks were irreverent towards animals, the Romans were downright sadistic and brutal. Animals from varying parts of the earth were pitted against each other or against human opponents, to fight to the death, often in a most violent manner. These games were a significant part of Roman life and quickly became such a spectacle that stadiums were built exclusively for the games, and could hold up to fifty thousand people. According to Whatmore and Thorn (1998), these spectacles could last up to twenty days and in the inaugural festivities alone, some nine thousand feral animals were slaughtered.

Whatmore & Thorn (1998) explain that the games occurred in different forms including "*ludi circenses*" (circus), where the main event was chariot racing and included animal acts. There were also staged acts like "*silvae*" and "*naumachiae*" where stadiums were converted to resemble a forest in the former case and a sea battle in the latter and were also termed "staged hunts." The largest followings, however, were for the gladiatorial events and wild animal combats. Respectively known as "*munera*" and "*venations*," these games pitted wild animals either against each other, or against animal fighters. These were usually people condemned to death for various reasons, by the Roman Emperor. Importantly, in the eyes of the public, they were seen as inferior and therefore equal in status to the beasts they fought (Whatmore & Thorn, 1998). Being killed in this honourable way, brought them slight reprieve.

Because the Roman games became such a focal part of public life, they also figured prominently in the material culture of the Romans. Artefacts would depict the games and their prominence in Roman society. Once Rome began to expand in the second century onwards, through military conquests, the animals used in the games became more exotic as they were imported from the Mediterranean, west of the Atlantic and from North Africa, especially for this purpose. This also encouraged commercial trade in animals that stretched even further to countries like India and China were species were especially glamorous.

The Emperor Honorius banned these gladiatorial combats in the fifth century, but the brutality in the minds of humans was not instantaneously erased. According to Cartmill (1993), there are only two recorded incidents and somewhat political agitation against the mistreatment of animals. The first was the expulsion of a man in Athens for the flaying of a ram and the second, more important, occurred in approximately 2055 BP. where a mob protested the butchery of a score of elephants in a staged hunt in Rome.

The age of the Roman and Greek empires saw poor management of open spaces and vicious brutality against animals. The Middle Ages was met with diminishing power of the Greek and Roman empires, but the legacy of hunting and urban sprawl continued, with the introduction of settler hunting in newly colonised lands.

(c) The Middle Ages and Renaissance

The beginning of the Middle Ages saw the power of the Greek and Roman empires diminish and importantly, a significant and steady increase in the world population. This occurred with the exception of the Black Death in 1348 (Cartmill, 1993). Rivalry between lords, however, entrenched the need for enclosed communes, further alienating natural landscapes. Medieval gardens consisted of vegetables and herbs used mainly for healing.

As farming practices improved and the need for food resources grew, tracts of forest decreased. Because of the limited access to hunting grounds, this practice in Europe became the sport of the elite.

Cartmill imagines that by 1200, both wolves and beaver had disappeared from South Britain, due to retreating forests and increased emphasis on hunting as a popular sport of the upper class. Mackenzie (1988: 13) explains that the Middle Ages saw the successful conquest of the Norman invaders in England, who introduced the notion of the hunt as "*an essential element of the royal prerogative*."

Great tracts of forest where therefore preserved through the promulgation of the Forest Law. This was not done with conservation in mind, however, but rather kept as *hunting preserves* or *game sanctuaries*. Peasants were forbidden from hunting and even attacking animals that threatened their crops, a law that was enforced tyrannically by the ruling class. Hunting became a symbol of aristocracy and sometimes an "*obsessive preoccupation*" (Cartmill, 1993: 66). Special hunting guidelines were even published documenting the correct terms for different animals, their offspring and even their droppings. There was also a range of methods to shoot game, depending on aspects like their stance and the direction they were facing when shot. Once the forest law was abolished the peasants, who saw the forests, as a symbol of class division and hunting as freedom, were ruthless in felling of the trees for trivial purposes (Coates, 1998). This reaction also resulted in the near extermination of game within these sanctuaries, which eventually took a long time to recover in numbers.

Vermin was a term first used in the Middle Ages, and is significant when referring to *problem animals* (discussed later). Special hunts were authorised in the latter part of the Middle ages to allow for animals that were seen as a menace to be hunted (e.g. foxes, lions). This practice was termed "protective hunting" but had as much pomp and tradition as any other hunt. In addition, the outbreak of the plague or Black Death at the beginning of the twelfth century saw rats at the target of human revulsion. Rats were seen as symbols of disease and suffering and European cities employed rat-catchers to eradicate cities of the rodents. Failure to do so would promote conditions in which "*plague and pestilence could thrive*" (Hinchliffe, 1999: 140).

The Middle Ages also saw the conquest or occupation of many African countries by European settlers. Because of the wide variety of animals, and the absence of poaching and hunting laws, these newly colonised lands were a hunting paradise for settlers. There was a wide variety of animals to choose from including predators that were not found in Europe. This period was the beginning of the trade in exotic wildlife and animal products, as well as the near extermination of game in African countries that would be eventually flooded with hunters in the eighteenth and nineteenth century.

The progression from the Middle Ages to the Renaissance, which started in Italy in early fifteenth century was in contrast to the irregular planning of the past centuries, the Renaissance placed much emphasis on order and discipline. This thinking was extended to nature, where the imitation and enjoyment of nature was removed, and nature was made to conform to the orderliness of the time and the organisation of mind and body. Roberts describes the period by quoting Jellicoe (1990 :14) "*for good and ill, man regarded himself as the centre of the universe.*"

The beginning of the Baroque Period in the sixteenth century saw the expansion of cities. Whereas cities were designed to close out nature previously, they were now expanded to the countryside. This period also saw the first formal parks and gardens and provision for sport was increased, as well as the invention of the "promenade" or recreational area. The planning principles of Britain were governed by aesthetic and intellectual appreciation of nature. This was a turning point for the way in which nature was viewed and it was to form the inspiration for urban open spaces thereafter. These perceptions gave rise to modern *utopian* views on nature that were to influence planning at later stages.

The Renaissance also resulted in greater emphasis being placed on the "*ethereal beauty of the quarry and less on bloody flesh and naked nostrils*" (Cartmill, 1993: 70). The legitimacy of man's dominion over nature was questioned, along with distaste by many for hunting. Writers were quick with criticise the practice and one surprising anti-hunting sentiment was expressed in a hunting guide that was widely used in the earlier Middle Ages.

This hunting scepticism and the question of human superiority were, however, a false dawn and not tolerated for long. As Cartmill (1993: 91) describes, "*The great systematic thinkers of the succeeding century made it their business to transform that scepticism into science and harness it to their service of man's dominion over nature.*"

(d) The Industrial Revolution

Up until the nineteenth century, the number of people in rural areas was still sizable as cities grew at a steady but very slow rate. Clarke (1998) explains that the urban world is a recent emergence, so although towns and cities have existed for over eight million years, fewer than three percent of the world's population lived in urban spaces in the 1800. This figure increased to approximately twenty – seven percent by 1950. The cause of this boom in urban inhabitants was the Industrial Revolution, termed by Roberts (1990: 20) as an *"irresistible, uncontrollable onslaught."* Although it is hard to say exactly when the Industrial Revolution started or ended, changes began in the late eighteenth century in countries like Great Britain and continued to the late nineteenth century where it spread to the rest of Europe and to the United States.

There were numerous factors that encouraged the Industrial R evolution, but the most important, explained by Frey & Zimmer, (2000) included:

a) The development of machinery to supplement labour in the agricultural sector
b) Mass production in manufacturing and industry which made obsolete pre – industrial handicrafts
c) The development of advanced transport and communications systems (i.e. steam engines and railway systems), which made trade easier and food provision from outlying areas simple.

Labour intensive industries allowed the influx of people into the city to be accommodated and the population grew. Planning in the city was absent and open space was created on an *ad hoc* basis.

Although developing countries experienced mass urbanisation later than most European and North American countries, when it did occur, it was at a much more rapid rate than developed nations. A phenomenon that occurred over a century in Europe occurred in less than thirty years elsewhere. Again, planning for a city commenced in a spontaneous fashion and nature or biophysical elements were generally disregarded. Even more detrimental in developing nations, was the high density of people in the city, as often, only one major centre was developed and the masses in search of work flocked to this area, with damaging consequences to the natural environment. Due to the large density of people in these evolving urban areas, space was precious and open spaces were completely excluded from development. Roberts (1990) adds that the removal of contact between nature and urban residents was on a scale unparallel by history. The result according to Mumford, (1961: 463) were cities that were "*bleak and ugly and hostile to human life even at its most elementary physiological level*" particularly in the slums or poverty-stricken areas.

With time, the working class came to recognise the confines of a purely urban surrounding and a call for the provision of parks and open spaces in these derelict areas was made, in an attempt to uplift the landscape and to some extent the spirit of the residents. This was landmark period in the history of nature's battle with humans, as for the first time, the need for and want of nature was recognised. Urban dwellers now felt the need to escape the *concrete jungle* that *they* had created. Consequently, the so-called recreational movement of the nineteenth century began with provisions made for open space, especially for the working class. Although this proved an improvement in the representation of nature in the city, many felt that the middle and upper classes relented to the concerns of the working class, to avoid unrest and promote economic efficiency. Whatever the motivation governments subsequently made public money available for the building of parks and recreational areas in cities. History has a way of repeating itself, however, and the parks that were supposed to represent the wild countryside became controlled and as Roberts (1990: 22) describes "*adjuncts of the city, and extension of its planned and constructed fabric.*" These manicured gardens were like imitations of the gardens of Rome and the Renaissance, only on a larger and grander scale.

Despite the progress during the eighteenth and nineteenth centuries in science and technology, progress in terms of the treatment of animals and human perception towards nature did not improve. On the contrary, hunting was on the increase along with trade in wildlife species and wildlife artefacts. In the late eighteenth century, *game preservation* was the trend. This paradoxical term was used to describe the rearing of rare animal species, especially exotic birds, in the wild. When of appropriate age, they would ironically be hunted and shot. This was another level in the domination of man, where the power of the life span of these animals was entirely in his hands. In addition, hunting restrictions and elitist hunting were reinforced. "*An imperial and largely masculine elite attempted to reserve for itself access to hunting, adopted and transformed the concept of the Hunt as a ritual of prestige and dominance, and set about the separation of the human and animal worlds to promote 'preservation' (later conservation) as a continuing justification of its monopoly*" (Mackenzie, 1988: 22).

Although working class activities like cock fighting and bear baiting were criminalised, elite blood sports like fox hunting, hare coursing and deer driving were on the increase. And despite efforts by the newly formed RSPCA (Royal Society for the Prevention of Cruelty to Animals) and the Humanitarian League, these sports entered what was termed by Mackenzie (1988: 27) their "*golden age*." The elite status that accompanied hunting was enhanced for some who owned private menageries. A menagerie was a collection of wild animals, usually exotic and often rare bird species, which were kept in cages at the residence of the hunter. The collection of animals displayed in menageries, were later used for public exhibitions, and when the Zoological Society of London formed in 1826, and began a formal scientific classification of the animals, the name menagerie was renamed to "zoo" a term still used today. The caging of animals was justified by a few explanations. Many felt the need for a formal scientific classification of animals, which could be accomplished in an environment like a zoo. And not surprisingly, control was needed over species that were seen as irrational and incapable of any sensible thought and reason (Anderson, 1998).

With the Romantic Period of the nineteenth century, around 1820, also came a passion for hunting trophies and décor.

Skins, heads and horns were displayed in special rooms, usually a billiard or smoking room, and were seen as an indication of skill in hunting. This century therefore added a new element to the spectacular showmanship that accompanied the sport. Rooms and even houses were decorated to depict hunting preoccupation.

The late eighteenth and early nineteenth century's were significant in terms of settler hunting. As mentioned above, settlers were enthusiastic about the lack of hunting laws and restrictions in colonised areas, and often saw hunting as a settler right in these areas, especially since colonised areas like Africa had every species of "*noble game*" (Mckenzie, 1998: 97). As a result, hunting and associated sport thrived in colonised areas. Mackenzie (1998: 116) explains, "*hunting went hand in hand with exploration.*" Africa originally had vast resources of exploitable game but as settlers progressed through the uncharted territories of Africa, they were brutal in their attacks on wildlife and showed no remorse even when exterminating entire herds of elephants and rhino. Subsequently, there was a dramatic decrease in wildlife numbers in a short space of time. According to Mackenzie (1998) two unique species, the blaubok and the quagga were made extinct and other species were exterminated in all areas of white settlement. Elephant, rhino and hippo were severely threatened by hunting, with their numbers constantly fluctuating.

Settlers in South Africa went a long way in taming the landscape. Settler farming led to the clearing of land and wildlife and the rearing of crops and livestock. Wildlife that were threat to livestock were considered vermin or "ongedierte" in Afrikaans, the native language of the Dutch (Beinart & Coates, 1995). This was a significant era in the status of the problem animal, as many animals that were seen as a nuisance in this period, were trapped and shot at will, as there were no laws protecting them.

Settler hunting also added another element to trophy hunting. Exotic animals like big cats were accessible in Africa and India. These were taken back to European countries and displayed either in public of in private areas.

Like trophy hunting in Europe, trophies hunted in Africa were used as a display of skill and prowess, and this was enhanced by the fact that the species was exotic and hunted in an exotic location. In addition, the trade of Ivory and other animal products increased drastically, and were used for various material uses like the decoration of homes or the creation of by-products like jewellery.

Trade in wildlife species also increased drastically, both to appease individual collectors, and to keep up a steady supply of exotic wildlife to zoos. With colonial conquests, and the increase in trade of alien wildlife, there was no place for indigenous and common animals at the zoo. Wild animals were favoured over ponies, dogs and cats, and the wilder and more exotic the animal, the better. Anderson (1998) believes that this domination over the untamed, exhibited not only imperial power, but the power or control of man over wildest nature. The demand for these animals in zoos all over the globe saw the development of a wildlife trade industry so large that by the late nineteenth century many zoos boasted sales or exchanges of wildlife as a profit to their societies (Anderson, 1998). Nevertheless, hefty prices were paid for exotic species like giraffe and rhino, which were thought, would be covered by gate takings. This demand greatly encouraged illegal wildlife trading and poaching.

While some resistance to the poor conditions in which the animals lived and to practices of animal cruelty was noted these were mainly due to concern over animal mortality rates and not directly animal welfare. And even though the living conditions of the captive animals were not optimal, zoos were marketed on their "natural" appearance maintaining that the housings of the animals in the zoo were even better than their natural habitat. Despite this, there were numerous deaths in zoos and these animals had to be hastily replaced to sustain interest in the zoos exotic wildlife.

Overall, the Industrial Revolution saw the beginning of economic *progress* in favour of sound ecological planning, a flaw in strategy and design still occurring today. The twentieth century was difficult for animal populations, especially big game, but the twentieth century would ultimately bring some reprieve in habitat protection and animal welfare.

(e) The Twentieth Century

The beginning of the twentieth century saw a renewed interest in the natural environment and its incorporation in an urban environment. Planners therefore tried to imitate the work of utopian designs and include more open space in their city arrangements. Cities were evolving, however, and with the addition of mechanical sciences and advancement in technology, the new practice was to combine nature with a technological advanced city. Disappointingly, again these were open spaces not seen as full ecological entities, but rather "*window dressing for the built ideal*" (Roberts, 1990: 26).

In addition, cities were modified around road networks and intricate transport systems. Development therefore reclaimed more and more countryside, as long-distance travel was more accessible. Urban sprawl in a sense began here, albeit at a small scale. An important piece of legislation was promulgated in Britain in 1909, enacted to deal specifically with aspects of Town Planning, followed by similar Acts passed in various other European countries. While these laws also played a role in "taming" nature, important advancements were made for incorporating open spaces in city centres. Sports fields were also on the increase, a distinctive characteristic in the early part of the century. The twentieth century also saw the two world wars. Barrow (1995) explains that World War II (WWII) hindered human concern for the environment and highly accelerated development. Economic, industrial and agricultural production was encouraged and threats to the environment like DDTs (Dichlorodiphenyltrichloroethane) and atomic weapons were developed.

Importantly, the 20th century saw a marked rise in global environmental awareness with publications on global environmental issues and the development of environmental pressure groups, coupled with legislation on the environment. The World Conservation Union was founded in October 1948 as the International Union for the Protection of Nature (or IUPN) following an international conference in Fontainebleau, France.

The organization changed its name to the International Union for the Conservation of Nature and Natural Resources in 1956 (IUCN) (IUCN, 2005). One of the most important activities of the IUCN is a regularly published list of endangered wildlife species known as "red data" species. Environmental publications came fast and furious during the 1960s and included ground breaking publications like "Silent Spring" by Rachel Carson dealing with agricultural pesticides, "Population Bomb" by Paul Ebrlich dealing with population growth and resource use, and significantly "Limits to Growth" by the Club of Rome (International Institute for Sustainable Development (IISD),1997). This landmark text predicted the dire consequences earth would face if growth continued unchecked. In the same year, a United Nations conference in Stockholm dealing with the environment and development (later known as the Stockholm Conference) responded to the global environmental crisis facing humans. Its declaration included the following statement "*Man has the fundamental right to freedom, equality and adequate conditions of life, in an environment of a quality that permits a life of dignity and well-being*" (Wilbanks, 1994: 542).

Environmental action also proceeded in the form of research, policy and the launch of "green groups" (environmental organisations) in the late 20th century (see Table 2.1). Significant was the United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro to mark the twenty-year anniversary of the Stockholm Conference. According to Wilbanks (1994), UNCED issued a world commission on Environment and Development that was legally binding on 170 countries to a Climate Change Convention, Biodiversity Convention and Local Agenda 21 Convention (LA 21) (discussed later). The subsequent Bruntland Report entitled "Our Common Future" highlighted in depth the global environmental crisis and provided potential global solutions to the problems. This was a comprehensive blueprint for a "Global Partnership for Sustainable Development" and it was here that the term "Sustainable Development" was first popularised (IISD, 1997). "Sustainable Development" subsequently changed the shape of development and became the buzzword of the last thirty or so years. It was developed as a broad term or guiding principle aimed at incorporating environmental concerns into development to ensure that it is more, as the term states, sustainable.

"Sustainable development," is officially defined as "*development that meets the needs of present generations without compromising the ability of future generations to meet their needs*," (WCED, 1987: 8).

Table 2.1: Some Developments in Environmental Policy, Green Groups and Research in the late 20th Century (Wilbanks, 1994; IISD, 1997)

Research	Scientific Committee on the Protection on the Environment (SCOPE) is launched (1957).
Green Groups	Greenpeace launches in Canada, with an aggressive agenda to counter environmental degradation through non-violent protests (1971).
	The Chipko Movement is launched in developing India in response to deforestation and environmental degradation (1973).
	The Greenbelt Movement is launched in Kenya. A community based organisation in the developing nation to address desertification (1977).
Policy	National Environmental Policy Act (NEPA) is promulgated in the US, which was the basis for EA's (Environmental Assessments) around the world (1969).
	United Nations Environment Programme (established as a result of Stockholm Conference) promotes "ecodevelopment" coupled with "small is beautiful" philosophy (1980).
	Convention on International Trade in Endangered Species of Flora and Fauna (CITES) promulgated, which restricts illegal trade of endangered wildlife (1975).
	Intergovernmental Panel on Climate Change (IPCC) launched in response to concerns on climate change and ozone depletion (1987).
	Development of "World Commission on Environment and Development" with a report called the Bruntland Commission (1992).

The main emphasis is understandably on the incorporation of the physical environment into development, to broadly, curb resource use, increase conservation and reduce waste generation. According to Connelly & Smith (1999) the core ideas of sustainable development are;

- Economy – environment integration: environmental consideration when making economic decisions and stimulating economic growth and development.
- Intergenerational obligation: realisation of effects of current development on environment and resource access for future generations.
- Social Justice: equal rights and access to quality environment
- Environmental protection: conservation of resources and protection of the non-human world.
- Quality of life: human well-being beyond material and economic wealth.
- Participation: structures to allow involvement by all, even previously marginalised groups.

The vagueness in the term "sustainable development" can be advantageous as it is more accessible to people and applicable in a variety of situations. Its ambiguity is also its downfall, however, as it is often interpreted in a superficial way and those using the idea are able to do so in development without compromising much. This is illustrated with examples of weak and strong sustainable development discussed later. Subsequently, various tools were developed to practice or incorporate sustainable development. These include policies and strategies like the Metropolitan Open Space System (MOSS), and Environmental Impact Assessments, and urban conservancies (discussed later).

The 1992 Earth Summit in Rio de Janeiro prioritised sustainable development as one of the global drivers for change in an environmental context. In response, Agenda 21 was developed as, according to Milton (no date: 2), the "*United Nations global action plan for socially, economically and environmentally sustainable development.*" Further recognised was the importance of local action in achieving this and Local Agenda 21 (LA 21) was therefore developed.

Diederichs & Roberts (2002) explain that over two-thirds of the Agenda 21 recommendations require action from the local government level in recognition of the goals of sustainable development. Local governments, United Nations leaders and non –governmental organisations, to coordinate LA 21 initiatives worldwide, therefore developed the International Council for Local Environmental Initiative's (ICLEI), which targets cities and facilitates the undertaking of sustainable development principles at a local government level. Three South African cities (Cape Town, Durban and Johannesburg) belong to the ICLEI, used the LA 21 mandate to develop specific programmes to ensure that the environment plays an integral part of development at a local level.

In an attempt to comply with international conservation trends and more specifically LA 21, many urban areas developed their own local management plans and formally declared their area as a conservancy. An Urban Conservancy can be defined as, "T*he voluntary co-operative environmental management of an area and it's community and users, and in respect of which registration has been granted by the relevant provincial nature conservation authority*" (Milton, no date: 4). Conservancies are designed to effectively manage urban areas by integrating the complex systems that are often juxtaposed in one vicinity (i.e. residential and industrial). In addition, a conservancy will try to conserve the remaining urban open spaces in an area and link these to other open spaces, creating an open space system or network. The major benefit of a conservancy is that the management of the system is placed in the hands of the residents or community in that particular area. Some of the responsibility and cost is therefore removed from municipal authorities and effective management can be achieved by residents that are located in the conservancy with both background knowledge of the area and a vested interested in maintenance of the area. Ultimately, it is hoped that public awareness of and involved in conservation is increased. A conservancy is an example of a holistic grass-roots approach to conservation, and one that is used in South African suburbs.

As explained above, the 20th Century saw a rise in mass consumption and capitalism, especially post WWII, and this need for constant material gratification was expressed in the exploitation of animals in zoos (Anderson, 1998).

The appeal of zoos was intensified with attractions like public feeding times for animals and animal acts being promoted. Breeding in captivity also occurred to maintain the steady supply of local and exotic animals. Anderson (1998) explains for example that in Adelaide, Southern Australia, the zoo was affected by the "quarantine regulations" of the country, restricting the supply of "attractive animals." The zoo tried to induce breeding of animals like tigers and polar bears, which proved unsuccessful. This was just another level in the dominance and domestication of human over wildlife. Anderson (1998: 45) details that the period after the Second World War was marked by "*a foregrounding of the entertainment value of animals, who were drawn into the vortex of mass capitalism's cultural and economic expansion.*" The era of mass capitalism saw zoo's draw widely on the hierarchy of humans and the entertainment value of wild animals.

The dualism of the previous centuries concerning animals and humans also carried forward to modern times and re-enacted in the relationship between humans and their pets. While domestic pets were common, the contradiction in the way in which humans viewed animals was still pronounced. Griffiths *et al.*, (2000: 57) explain, "*On one hand, dogs serve to complete a person or a family and are treated with affection similar to that given to people. On the other hand, in common English and American usage, 'a dog's life' is an unhappy slavish existence; and a "dog's death" is a miserable shameful end*". The text goes on to explain the relationship between humans and pets is one of both affection and cruelty but affection itself cannot be separated from a persons desire to dominate. Tuan reiterates this point is his important text entitled "*Dominance and Affection: the Making of Pets*" and is quoted in Griffiths (1998: 57) as explaining a pet should fit into a home as "*unobtrusively as a piece of furniture.*" A pet may then be subject to practices like spaying and regular shampooing in an attempt to "de-nature" them and while a pet owner will shower a pet with affection, the non-human characteristics that the animals retains are treated with disgust.

While trophy hunting laws and CITES came into effect in the early twentieth century, the picture for animals is still a gloomy one, with factory farming, trade in wildlife, laboratory testing on animals, habitat loss and the overall dominance of humans ever present in our "modern" society.

According to Emel & Wolch (1998) the international trade in just live wild animals and animal body parts is estimated at USD (United States Dollars) 7 – 8 million per annum. A large percentage of the animals being traded do not even survive the journey and if they do, their life span is significantly reduced. Reproduction hardly occurs in captivity and endangered species suffer the most from illegal trade (and it was probably the trade that placed them on an endangered list in the first place). Animals (or animal representatives) have increasingly found their way in to political agendas and are able to play a greater role in animal and habitat protection, although free trade agreements do hamper progress in this area (Emel & Wolch, 1998). Defence groups of animals range from international pressure groups like Greenpeace and Friends of the Earth Society to local societies like Animal Anti-Cruelty League (AACL) and Society for the Prevention of Cruelty to Animals (SPCA), and global conventions like CITES.

Importantly, recent research and literature (see Philo, 2000; Emel & Wolch, 1995) have expressed the need for greater focus on not just the issue of the dominance of man over animals but also animals as a separate entity with agendas of their own. Philo (1995) explains that animals are generally overlooked as distinctive objects of study and they are often submersed into broader categories of "nature" or "environment." Recognition is needed, of the self-awareness of animals rather than entities to be "*trapped, counted, mapped, analysed*" (Philo, 1995: 658). Cansdale in Philo (1995) expresses himself as an advocate for wild animals and places humanity's subjugation of animals under scrutiny. While sadness is shown for the abuse and eradication of animals at the hands of humans, Cansdale insists there exists an *agency* of animals giving them the capacity to sometimes rebel against human impositions. For example, some animals have illustrated a resistance to the process of domestication by running away.

With immigrants and rural dwellers entering the city in search of work and opportunities, the current growth rate of cities is considerable. In addition, an increased share of production is now organised globally instead of within the narrow confines of nation states and empires (Clarke, 1998). Both foreign investment and government expenditure are focused mainly in urban cores.

Multi-national and trans-national corporations situated in these cities makes them globally connected at the price of *cheap* labour, which is readily supplied, often by rural immigrants. Commercial agriculture is popular and there is therefore very little incentive for subsistence farming. Green fields (agriculture) and open space once used for this purpose are being cleared and modified to developed areas.

Moreover, this process is made easier by the ever-improving transport and communication systems. A new trend in the modern city is decentralisation, or urban sprawl. "*New urban areas are now being developed in a low-density mode following a different model than that offered by the single core/hinterland development experiences around older cities*" (Frey & Zimmer, 2000:15). Common now is a centre of corporate headquarters and juxtaposed, is the less impressive industrial and manufacturing area. Suburbs are common, with urban dwellers preferring to travel to work and enjoy the luxury, peacefulness and aesthetic advantage of a suburban home.

Most suburbs, especially the more affluent ones, pride themselves on a natural green appearance. The gardens, parks, sports fields, golf courses and recreational areas are a well-maintained feature. They are however, very superficial open spaces, as their close proximity to humans, size and management means that they will never reach the level of an authentic ecosystem. These spaces are rarely home to many animal species, and the complex functions, webs and systems of natural habitats, are hardly found here.

Overall, the development of decentralised corporate centres and suburban areas may seem feasible and convenient. It may also encourage the enjoyment nature and create the impression that a person is closer to nature in lush green suburbs. But the massive rate of habitat destruction or modification that arises from development of this nature, cannot be compared with the small, isolated plots of open space that are left after development is complete. The spin-off from this process affects both humans and nature alike. As Clancey (2002: 10) dramatises, "*Urban sprawl. It's coming to a town near you (if it hasn't already). Last Halloween I dressed as Urban Sprawl. Even among the goblins, ghouls, ghosts and gremlins, I was the nastiest, scariest creature of them all.*"

The twentieth century was a conflicting one, characterised by animal abuse and urban sprawl on one hand, and global environmental awareness and animal welfare action on the other. While hope in the form of this activism does exist, the challenge of curbing unchecked and unsustainable growth persists. While the facts on the trade of endangered wildlife and animal welfare presented do present a bleak picture, recent state intervention, global activism and local involvement provides are more promising outlook. Moreover, recognition of animal "agendas" as opposed to animals as mere animate objects is unprecedented given that never before in history have animals been viewed in this light.

2.3.2. Reshaping the Land

"Ecologists have traditionally sought to study pristine ecosystems to try to get their workings of nature without the confounding influences of human activity. But that approach is collapsing in the wake of scientists' realisation that there are no places left on Earth that don't fall under humanity's shadow" (Gallagher & Carpenter quoted in Western, 2001: 5458).

Being enlightened on the causes of and forecasts for urbanisation does not necessarily mean that the subsequent implications are immediately comprehended. For most, the picture illustrated is a beneficial one. It means access to employment, shelter, health facilities and other essential services. An increase in the urban population at such an alarming rate therefore, may not be cause for concern, without the realisation of the associated increase in physical size of urban centres (EPA, 1995).

The quantity of land that will be required to house the world's growing urban population is significant. A State of Environment Report, released by United Nations Environment Programme (UNEP) approximates seventy percent of the Earth's land surface, will be lost to urban infrastructure in the next thirty years (GEO, 2002). This grim outlook is shared by the author/s of *"Indirect Causes...Habitat Loss"* (Oracle Thinkquest, 2000) which explains that a startling figure of three million acres (approximately twelve thousand square kilometres) of natural habitat is lost every year to urban-driven projects.

In addition to the quantity of open space being lost, also important is the type of land converted and its succeeding land-use. The increased need for land more often than not results in the conversion of pristine open space, green fields and forest. Commonly, urbanisation leads to the conversion of land at the rural-urban fringe, for residential developments. "*This may affect land which is regarded as an environmental asset, such as remnant bushland or a well – managed private holding, or which is economically valuable with agricultural or mineral potential*" (EPA, 1995). The fact that damage due to urbanisation tends to be concentrated in species-rich areas makes sense, as plants, animals and humans alike, are attracted to areas with favourable conditions, like a moderate climate and substantial water supply (Oracle Thinkquest, 2000). The reason that these areas are favoured for residential developments is therefore clear. In terms of construction, Beaumont (2001) adds that an urban developer naturally prefers less undulating land, like floodplains, coastal plains, river terraces and similar land with gentle slopes, which will also have both agricultural and ecological value.

It could be argued, however, that the alteration of land for agricultural purposes rivals urbanisation. This might be true, but Heilig (1996: 110) contends that urban land conversions are "*much more persistent and intrusive. Once a patch of land is sealed off by tons of concrete or highway pavement, it is extremely difficult, if not impossible, to transform back into a natural ecosystem.*" In comparison, green fields may affect large tracts of land, but the impact and intensity is relatively low, while the potential for rehabilitation is great. In addition, the increased need for land, for agricultural purposes, is often attributed to the high consumption rates of the urban sector, which relies on the rural periphery for its food supply.

Deforestation is also a consequence of the need for land due to rapid urbanisation. Deforestation is the clearing of a settlement of trees (usually a forest), generally without adequate replanting. While it is a practice performed for many years, for purpose of collecting firewood and growing crops, the tracts of land cleared for urban settlements are recently more sizeable and the impact permanent. Even if entire forests are not cleared, roads and other pathways are cut through them, causing *habitat fragmentation* (discussed later).

Animals and plants find it difficult to survive under these conditions due to loss of keystone species, invasion of alien species and the breakdown of ecosystem functions (discussed later). Movement across these pathways is often fatal to animals; therefore, habitat modification is often as bad as destruction of the total habitat. In addition to the impact that urban infrastructure poses, opportunities for further development are also created and this further affects local areas. Helig (1996: 110) therefore asks one to consider "*what a small road can do for a remote forest area. It might open it up for loggers, oil explorers, poor farmers, land speculators, gold diggers, prostitutes, butterfly catchers, or tourists. They will flood the area and change it within a few years.*"

In addition to the direct impact of urbanisation, (i.e. the physical size of land required), large urban agglomerates are increasingly associated with high consumption and resourse use. As mentioned earlier, land cleared for use by agricultural fields are often done so to serve the increasing food demand in urban centres. Food preferences, lifestyles and diets have altered and an increasing portion of land is required for luxury items such as coffee, chocolate and refined sugar (Helig, 1996). The consumption of meat is also on the increase and large tracts of land are required for the grazing of livestock.

Food consumption is not the only cause of deforestation and land-use changes, caused by urbanisation. Overall, many advances in cities, termed by Heilig (1996: 125) as "*economic modernisation*," have emerged and have completely altered global land-use patterns. Simple features that are mostly exclusively urban have large impacts on land and natural resources.

For example, the boom in ownership of personal computers has seen a phenomenal increase in paper use and the expansion and advancement of delivery services in urban areas has resulted in increased use of packaging materials. Both of these have had a considerable bearing on forest resources.

It might be argued that cities are *greening* and operating increasingly in a sustainable way thanks to sustainable development, but in reality, sustainable development in most development around the world is integrated in a superficial or weak form. Gibbs *et al.* (1998: 1352) explains, "*Weak sustainability places emphasis on reducing the effects that development has on the biophysical environment without compromising economic growth.*" A common view in development is that human capital and natural capital are highly substitutable and that there are no limits to resource use or waste production, as backstop technology will always save the day. Environmental and social impacts are therefore mitigated in an *ad hoc* manner and the *no-go* option in development rarely considered. In an urban environment, only surface appearances are changed with the creation of superficial recreational zones or manicured gardens.

Strong sustainability, the alternative requires questioning consumption patterns and recognising the earth's limits and boundaries. The use of strong sustainable development would mean to assess the system of a city as a whole. The impacts that are more indirect are also evaluated (i.e. waste disposal). A further step will be to address the characteristics of urban dwellers and question their high consumption patterns. The ecological footprint of the city is considered in detail. Instead of just mitigating impacts, the source and cause of the impacts are examined.

In essence, the impact of urbanisation on the natural environment is both intense and mostly irreversible. Urbanisation has both the direct impact of habitat destruction and modification and the indirect impact of increased consumption and unsustainable development. In addition, small scale developments often have large impact spin-offs. The implication of the high rate of habitat destruction and modification has detrimental effects at both a local and global level, and will now be considered.

2.3.3. Impacts of Habitat Destruction and Fragmentation

Clearly, nature is not viewed as an obstacle in the face of progress. Nor is it viewed holistically, as an integral component of the earth's natural system. Nature can be wielded, tamed and removed if desired to make room for growth and expansion or retained for its various benefits but in a controlled fragmented form. This process of manipulation has both immediate and potential impacts, of which the latter is poorly understood, and the magnitude inadequately grasped.

To understand the effects that construction or urbanisation has on the natural environment, a person needs to consider the basic concepts of ecology. Ecology is commonly considered as "*the study of the relationships of organisms to their environment and to one another*" (Thompson, 2001: 65). A habitat is a place or type of place where an organism or a population of organisms exist (Tyler Miller Jr, 1998). However, a habitat is much more than an area of dwelling. Within a habitat, exists a complex network of ecosystems and communities. An ecosystem is considered a community of different species interacting with one another and the physical non-living environment (Tyler Miller Jr, 1998). The populations of different species interacting with each other in a specific area within a particular time form a community.

The distribution of these plant and animal species within a habitat, are subject to limiting factors such as climate, altitude, and interactions between biotic (living) and abiotic (non – living) elements. They are further restricted by their relationship within their community and ecosystem, where intraspecific (within species) and interspecific (between species) interactions occur (Thompson, 2003). These factors are constantly evolving, but at very slow pace, allowing nature to adapt to variations in the condition of their habitat. These factors create a level of organisation within an ecosystem, meaning that a habitat exists as more that just an open space, but as an intricate web of activity.

Stability, which is essential to vulnerable communities and ecosystems, is compromised during the process of urbanisation. Habitats are either wholly removed or they are fragmented, with patches of the original habitat left behind.

Changes in the systems therefore occur more rapidly, and many species cannot withstand the pressure of this unnatural process. A breakdown of one of the processes that occur in an ecosystem, or the removal of even one species, could result in a breakdown of the systems that govern an ecosystem and that distinguish a particular habitat from any other.

(a) Habitat Destruction

Whole habitats are removed during habitat clearing, so plant and animal species are eliminated, except fauna that are able to migrate and settle successfully in another habitat. Impacts are experienced at all levels of biological organisation and results in a complete breakdown of communities and ecosystems. One of the most severe impacts of habitat destruction is that on habitat diversity. Generally, the unique combination of species, population and communities, located within specific habitats and ecosystems, all contribute to the level of biodiversity, commonly evaluated through variation in genetic characteristics, species and ecosystems or habitats (Thompson, 2003).

Habitat destruction results in a large reduction of natural habitats, which generally have unique characteristics that are indigenous or exclusive to a particular region of the world. Some habitats are affected more severely than others, due to the environmental conditions of that particular area. Forests are an example of a habitat under threat. It is estimated by the The World Conservation Union (IUCN) that only 40 million square kilometres of forest still exist and of this only 8% are protected under the IUCN (Thompson, 2003). Mangroves, wetlands and coastal zones, are other highly specialised habitats that are at risk all of which add to the global threat of loss of ecosystems and habitat diversity. Between twenty-five percent and fifty percent of the world's wetlands has thought to be damaged, with the remainder, being affected by pollution and other human activities (Tyler-Miller Jr, 1998).

Following the destruction of natural habitats is the reduction of biodiversity. Pressure is exerted on wildlife from the lack of suitable habitats or just plainly the lack of space.

Unless fauna is able to migrate and settle elsewhere, there is no hope for survival in a cleared habitat. Estimates show that the rapid expansion of infrastructure has placed twelve percent of birdlife and almost twenty-five percent of mammals under threat, globally (GEO, 2002). If a species is indigenous to the particular habitat being cleared, that species is likely to face certain extinction, which is the fate of a number of plant and animals species currently. Habitat destruction is considered the main cause of extinction and for this reason is considered by Boswell *et al.* (1998) as the greatest conservation crisis. Research (Tilman *et al.*, 1994; Loehle & Li, 1996) has also shown that the destruction or fragmentation of habitats incurs an extinction debt. So a higher number of different species are likely to suffer from effects to the habitat that originally expected. Studies have shown that while models predicting the extinction debt have to be administered with care, not to overestimate the damage, a debt definitely does exist and the effects of habitat destruction can not be immediately quantified.

(b) Habitat Fragmentation

Fragmentation occurs when a large open space area is utilised and only smaller patches of the original area remains (Thompson, 2001). Although these patches sometimes remain with the hope of conservation or open space protection, the effects of construction on these areas are vast and varied. These patches cannot survive in isolation due to various effects.

Isolation of habitats has a greater effect on the survival of that habitat than is initially perceived. In addition to the impacts explained above (habitat destruction) Western (2001) explains that fragmenting habitats affects the ecosystem processes and functions in various ways. The productivity of the habitat decreases and although resilience increases, resistance decreases. Species richness and the mean body size of species decreases. Turnover rates and population cycle rates also decrease. In terms of function, the great loss of diversity results in a reduction in the functioning of ecosystems and food chains. The resistance to invasive alien species, pathogens and pollution decline.

Once plots are isolated, the migration of fauna becomes difficult. Animals needing to migrate for various reasons like breeding purposes are unable to do so. Isolation results in a reduction in the home range of an animal and therefore a limited food supply. This is true especially for larger animals, which have a large daily food intake and a large home range.

Fragmentation also results in increased homogenisation. Interbreeding reduces species richness and increases the risk of genetic defects. The life cycle of some species may be affected, where movement to another key habitat is necessary to mature to an adult (Thompson, 2001). Often, animals attempting to migrate to other patches have to cross roads or other built environments, and are injured or killed in the process. Escaping adverse conditions, like drought or fire is impossible. Fragmentation also affects other biophysical characteristics, like soil properties and water cycles (Western, 2001).

A fragmented habitat has an increased amount of *edge* in relation to the area of the *core* habitat (Thompson, 2001). The *core* of a reserve is the large continuous area of natural vegetation, which functions as a central habitat for species, which typically are of conservation importance (Environmental Branch, 1998). The *edge* of a habitat is the boundary of a fragmented landscape that is subject to a number of impacts and disturbances from surrounding environments. The distance between the core and the boundary of the habitat is usually substantial, and the disturbance from the surrounding environment is absolved before impacting on the ecosystems processes and inhabitants.

The area between the boundary and the core of a habitat is reduced in fragmented landscapes as these habitats are shaped irregularly and overall have smaller areas. In some cases the entire habitat is considered an edge (Thompson, 2001). In addition to edge effects, fragmented landscapes more often than not, suffer from the lack of *buffer zones*. Under natural conditions, a habitat or reserve will be surrounded by a zone of intermediate land-use (between core vegetation and periphery) that serves to protect the core from external impacts. This area is absent when habitat is surrounded by a built environment and suffers directly from the impacts thereof.

A global threat to all natural habitats and biodiversity, is the infestation of invasive alien species. An alien species is commonly defined as "*one that has been brought intentionally or unintentionally by people to areas outside its natural range of distribution,* (Macdonald *et al.*, 1986: xiv). The proximity of open spaces to urban areas, increases the likelihood of alien species invasion in adjacent nature reserves and habitats because of the number of invasives present in domestic gardens and road verges. The movement of motor vehicles closer to habitats also increases the spread of invasives, as vehicles act as artificial pollinating agents. The effects of invasive aliens in indigenous habitats area vast. Macdonald *et al.* (1989) explain that invasive alien species affect geomorphological processes, alter hydrological and biochemical cycles and alter fire regimes. They also importantly, compete with native species for spaces and valuable resources like water, often eradicating indigenous plants and animals and altering the habitat completely. Moosa (2000) explains that the loss of biodiversity is one of the most serious environmental problems of the modern era, and aliens are one of the main offenders, competing with and threatening indigenous species.

Another potent impact is the effect of fragmentation on *keystone species* in a community. A keystone species is one that plays a functional role in a community, where it initiates or supports to foundational processes. The army ant of certain Neotropical rainforests is an example of a keystone species used by Boswell *et al.* (1998) in their studies on keystone species and conservation. Both invertebrate and vertebrate species rely on the army ant for survival and would probably face extinction if this ant were to disappear. Their regular raids create a mosaic of habitat patches in different stages of ecological succession and encourage species diversity. In addition, almost fifty bird species rely on the army ant to extricate insect prey from leaf litter. A keystone species is therefore essential to the survival of other species in a particular ecosystem, but often they are the most vulnerable. The removal of a keystone species therefore has a snowball effect, disturbing numerous other species, often resulting in their extinction.

Numerous addition impacts due to urbanisation are regularly documented, including the effects of pollution and litter that have increased due to the proximity to human settlements.

An increase in the number of stray or domestic pets entering these areas and damaging the flora or spreading rabies to fauna is also a problem. Overall, the effects of urbanisation on natural landscapes are significant. In addition, the implications of the loss of diversity and the impacts on the earth's land resources, produced by urbanisation cannot at this stage be fully grasped. There are uses or functions of these habitats that are poorly understood and the consequences of their destruction will only be realised at a later stage.

2.4. Urban Ecology and Conservation

"*Urban experts love the future, but rarely think ahead. Half a century seems to be an especially challenging span for the city-watcher's imagination: near enough to be personal, distant enough to baffle or seduce*" (Matthews, 2001: 183).

2.4.1. Background to Urban Conservation

Clearly, the history of the relationship between humans and nature in the city has not been a very pleasant one. Poor planning and a certain disregard for flora and fauna while expanding urban areas has led to a lack of substantial open spaces in cities and various associated problems. It was not until 1945 that pioneer work by Fitter (cited in Roberts 1990) was carried out on the effects of urbanisation on the natural environment. This was overall, a very significant time for conservation. Post World War II expansion occurred at high unchecked rates all around the world, sparking a concern for the disappearance of natural open spaces. Post war lifestyles also enjoyed an increase in leisure time and the demand for recreational areas grew. Subsequently there were publications similar to that of Fitter's, but these were few and far between. The early and mid fifties saw the rise of involvement by civil society organisations that became critics of urban sprawl, citing aesthetic value, recreational value and conservational value as reasons for preserving open space (Rome, 1998).

A realisation in the sixties, that humans and the earth faced catastrophe with the current rates of population growth and deterioration of the natural environment, then initiated change.

This realisation, however, took a longer time to reach the urban world and Patrick (1998) explains that a revolution that began in the early sixties in Europe and North America took about twenty years to reach the city. This change brought with it a comprehension that despite the magnitude and growth of cities, nature managed to survive and develop. Termed by Patrick (1998: 10) as "*unofficial countryside*" were spaces in the city that resembled that of the countryside like railway embankments and gravel pits. Wildlife existed in abundance in these areas, and necessitated urban conservation for the utilitarian purpose of maintaining health and quality of life in the city.

Despite these realisations, urban ecology did not emerge as a separate discipline until the seventies (Roberts, 1990). Studies on urban fauna and flora increased resulting in a growth in the study of urban ecology. Subsequently, plans were initiated to manage nature that ranged from elaborate *urban conservation strategies* like nature conservancy programmes to concern and awareness of the *greening* of cities (Roberts, 1990). In addition, an increase in research on urban biogeography was noted in the late seventies.

Despite the increase in interest in urban nature and the increasing mistrust of science and technology, in depth research into urban ecology was still rare. Programmes in this field were somewhat superficial, aiming to generate general awareness instead of making institutional changes and focusing research on the problems. Urban biogeography research was even poorer, and often treated by the scientific community as described by Roberts (1990: 38) with "*some aloofness.*" And while many researchers suggested detailed investigations into the causes and solutions of urban environmental problems, this was still uncommon and progressing more slowly than research in other aspects of the natural environment discipline.

Recent developments have been more positive with various programmes and assessments being initiated to address the impacts of growth and development on the urban environment. Strong arguments have also developed in the final decades of last century "*that the future of the city can only be assured if a more sustainable approach to urban development is adopted*" (Thorns, 2002: 204).

2.4.2. What is Urban Conservation?

With the alarming rate at which the world's terrestrial and marine ecosystems are being utilised and damaged, the intention of conservation should be to provide an appropriate and beneficial management system, to protect the fragmented reserves that remain, thereby preserving the earth's genes, species, communities and ecosystems. Tyler-Miller Jr (1998) adds that one of the conservation goals is to investigate the impacts of humans on biodiversity and develop practical approaches to preserving biodiversity and ecological integrity.

Previously, attention was focused on the preservation of single species. This focus has recently moved (with the exception of highly endangered species) to concentrate on communities and habitats instead, following the reasoning that by preserving whole communities and ecosystems, ecological functions and processes will be preserved. This will in turn protect individual species (Patrick, 1998). Roberts (1990: 40) therefore describes the broad aim of conservation as "*the maintenance of maximum sustainable biotic diversity and the minimisation of extinction.*" A sad reality is that much of the world's biota will soon be confined to nature reserves and national parks and conservation of these open spaces is therefore essential (Shafer, 1990).

For a long time, conservation was considered a concern with the "*wise use of agricultural and public lands*" (Rome, 1998: 269). The high consumption of land use in urban areas, however, has recently led to specific attention focused on urban conservation. Urban conservation is often quite complicated as the density of the human population is so much higher in cities, thereby adding a complex variable to consider. As Alberti *et al.* (2003: 1173) state "*the greatest challenge for ecology in the coming decades is to fully and productively integrate the complexity and global scale of human activity into ecological research.*" Cities are human dominated ecosystems and the challenge of preserving open spaces and reserves with the level of impact experienced in these areas, is a difficult one. An urban area requires a set of objectives and aims specific to that area, where fauna, flora and humans are able to co-exist with minimum conflict and impact.

For this goal to be realised, planning and development in cities have to be done in a more holistic manner. Often decisions regarding development and the environment are guided, or often dictated, by political, social and economic ideals. Bringing scientific reasoning and conservation criteria to the forefront of decision-making will promote more holistic and equitable resolutions. Leopold quoted in Rome (1998: 267) puts it plainly by stating that "*a system of conservation based solely on economic self-interest is hopelessly lopsided.*"

2.4.3. Motivation for Conservation

A person may be tempted to ask "why conserve anyway?" There are numerous answers to that particular question and often, it is the opinion of the individual that counts the most. What influences an individual plays an important role. Religion, fear or even a guilty conscience could dictate a person's attitude and action towards nature.

(a) Religion and Philosophy

"*Religions between them own approximately seven per cent of the Earth's inhabitable surface, have influence over more than half the world's schools, and act as the main community and spiritual centres for more than 4 billion people*" (Finlay, 2003: 30).

Roberts (1990) states that even at the most basic and elemental level, the attitude of humans are constantly dictated by beliefs of identity and destiny and therefore religion. And the failure of the scientific community to impose codes of ethics on society, by attempting to keep science and technology value free, has only resulted in the perpetuation of a code of ethics from the pre-scientific era. For this reason, religion remains an extremely powerful influence around the world and exerts an unspoken authority over more than sixty percent of the world's population, rivalled by no other organisation, school of thought or policy. Coward (1995: 2) argues that religion shapes people's attitudes and behaviour towards the environment, fertility planning and resource sharing. "*It can obstruct or foster responsible behaviour.*"

Finlay (2003: 30) adds that "*religion is immensely powerful in most parts of the world with followings and influence that NGOs and environmental movements could not even dream of.*" Therefore, at a basic level, one of the most compelling reasons to care for the environment is that it is fostered in your religious beliefs or values. As Finlay (2003) explains, will a community be more convinced not to log a mountain if the government tells them to or if they believe that it is sacred? Often, the latter will be more convincing.

(b) Utilitarian

Looking at the history of the development of the city and the relationship between humans and nature within, it can be clearly seen that the notion that humans are a dominant species and therefore see fit to control and exploit nature. From this line of thinking, comes the view that nature, open space, and therefore the wildlife within, are worthy of preservation and conservation, if they have are of use to humans in some way. The reasoning behind conservation in this case is a utilitarian one, where benefits are accrued and can generally be quantified in some way. While many argue that this form of analysis of open space systems is beneficial, as it illustrates the link between a sound economy and the environment (Sepping, 1994), some (Roberts, 1990: 48) maintain that reasoning of this nature entrenches the belief that humans are stewards to the land and "*a highly respected middleman between the Creator and the Creation.*" This view is taken by many (Ness in Roberts 1990: 48) as arrogant because humans are not administrators and "*nature is not a vegetable patch.*"

Open spaces are nevertheless noted for the benefits that they provide to inhabitants of urban environments are often *marketed* by these very uses. In a free market system it is difficult to justify the large amounts of money spent of urban nature conservation, without providing some indication of the returned benefits. These extensive benefits are therefore documented to allow for improved decision making in conservation (EB: DPSU, 1999).

(c) Physical Benefits

The presence of an open space in an urban area brings with it numerous unsurpassed physical advantages. One of the most important benefits is that on the local climate. Built environments generally have a greater thermal conductivity and heat capacity than vegetated areas (Patrick, 1998). The heat stored by these structures during the day is emitted at night causing the localised effect known as an *urban heat island*. The heat in turn traps dust particles creating a dust dome. The presence of vegetated areas increases the reflectance of solar energy, and this along with evapo-transpiration significantly reduces the effect of the urban heat island.

An urban area affects an area's hydrological cycle by changing the run-off, peak flow characteristics and water quality (Roberts, 1990). Built areas have a greater run-off and lower infiltration than vegetated areas. The water-proof surfaces of an urban area reduce the natural absorption resulting in an increase in flash floods and increased flow time. The recharging of ground water systems is also affected. Planting indigenous vegetation increases the infiltration of precipitation and reduces erosion and stream sedimentation (Patrick, 1998). Drainage systems are able to cope better and floods are therefore less common.

Pollution is notably higher in urban areas than in rural areas (Roberts, 1990). A city has higher levels of particulate and gaseous pollutants, which contribute to greenhouse gas accumulation and the urban heat island. The presence of vegetated areas within cities reduces the air pollution, as leaves effectively increase turbulence in the air stream causing pollutants to impact easily on vegetation, which facilitates their removal (Roberts, 1990). In this way, vegetation acts as a natural air filter. Noise pollution is also considerably higher in a city, caused mostly by street traffic. Noise levels exceeding those normally tolerated by the human ear, causing both hearing and stress problems. Roberts (1990) and Patrick (1994) agree that narrow strips of vegetation along highways can effectively absorb noise, especially high frequency sounds, reducing the effects on surrounding residential areas.

Wind dynamics are also affected in cities. Either, the wind level decreases and pollutants hang in the air longer, or a *tunnel effect* ensues in streets with high buildings. This means that pollutants like dust are lifted and concentrated in one area. Vegetation creates the perfect scenario of a breeze as opposed to a tunnel, drawing cooler, cleaner air to the warmest part of the city (Roberts, 1990).

(d) Psychological and Recreational Benefits

Over the years of urban development, a want for open spaces within the confines of urban concrete jungles was noted. During the industrial revolution open spaces were vociferously demanded to break the monotony of the urban landscape and lift the spirits of the working class. The psychological value of open spaces remains as important. In terms of religion and spirituality, open spaces can be very sacred, and valued. Many city inhabitants have very strong ties with the land and require its presence for their well-being.

Open spaces are also important contributors to recreation and tourism and act as indirect stress relievers. Roberts (1990: 59) describes recreation as "*any activity that man indulges in to re-create himself, seeking relief from normal routine.*" Humans have an inherent need for contact with nature in the monotony of an urban environment and often associate their fondest childhood memories with nature. This carries to adulthood, where relaxation and stress relief is often associated with aesthetically pleasing open spaces. Open space is also linked to sport, an important form of relaxation. In addition, open spaces are marketed as tourist attractions, making these areas economically and often culturally valuable. Tourism is also important for income generation for previously sidelined, indigenous communities. Partnerships with nature are essential for these communities, as they learn to foster and care for the land, which in turn provides their for livelihood.

(e) Education and Futurity

Open spaces are important for education both for the current and future generations. At present, numerous educators around the world recognise the value of pupils visiting open spaces to enhance learning and general knowledge. Sepping (1994: 13) states, "*It* (natural areas) *creates an awareness among inhabitants of the natural processes operating in the urban environment and emphasises the fact that an acceptable quality of life is dependent on the way the environment is treated.*"

Futurity is also an important consideration. If, as predicted, the world's natural vegetation and wildlife will be confined to open spaces and nature reserves, an important part of education in the future will depend on the preservation of our current open spaces.

(f) Biodiversity

In addition to the faunal diversity preserved in an open space, the most important benefit of open spaces with regards to this dissertation, is the presence of wildlife. The habitat and refuge provided by open spaces to urban wildlife, is invaluable in preserving floral biodiversity and minimising conflict with human inhabitants. As mentioned above, the preservation of biodiversity is important for maintaining natural processes in ecosystems, for its uses to humans and because of its inherent right to exist. Some species only occur regionally and with the current rates of urban expansion, it is important that habitats are preserved, to protect the wildlife and avoid direct human contact.

(g) Economic Benefits

While the direct economic benefits of open spaces are few and generally confined to income from raw materials and food products, there are numerous indirect advantages.

Income generated from eco-tourism and recreation is a major profit taker in the public sector. In addition, the real estate markets have noted an increased value of properties with trees and/or adjacent to open spaces (Sepping, 1994).

It is important to note, however, that all the above mentioned benefits (physical, psychological) have indirect health and economic benefits. The natural mitigation processes that are provided by urban open spaces, costs a state only what is spent on conservation. An environmental appraisal of the benefits will show that the direct and indirect gains accrued from open spaces in an urban environment balance or outweigh the costs of maintenance and conservation of these spaces.

(h) Environmentalism

As mentioned previously, the basis for conservation may often lie with a persons understanding of nature or ethical beliefs about the environment. Many humans recognise the intrinsic value of nature and hold a general awareness of their surrounding environment. Along with this understanding comes a consciousness of the inextricable link between people and the environment and this in turn lends to a moral reasoning for the conservation of nature. It is felt by many that the environment *ought* to be cared for and protected – a somewhat ethical approach (Roberts, 1990). Nature is conferred the right to exist for its own sake and is protected by choice not for its use to humankind. Reasoning of this nature is often abstract and difficult to comprehend, but has nevertheless gone a long way in providing a clear and unequivocal motivation for conservation.

Green activists, or *Greens* as termed by Pepper (1996) and followers of associated schools of thought like *deep ecology*, all advocate fundamental social change to achieve a sustainable society. It is felt that a society dictated by economic principles and governed by profit maximisation are highly unsustainable. These values influence high resource use and ultimately wastage. There should therefore be a concern for the planet as a whole and not just the human component. Ecological science is not relied on exclusively, as emotional and intuitive wisdom is taken into account in decision-making.

The diversity of the earth's inhabitants should be viewed as its strength instead of a weakness, as a failure to accept this leads to a lack of "*robustness and a destructive instability*" (Pepper, 1996). Cities are seen to breach ecological laws, so a love for the wilderness and countryside is fostered. In addition the intrinsic value of nature is recognised and preservation needs no justification, other than nature having the right to exist.

This argument is taken a step further by the *Gaia* hypothesis, which argues that the earth is a single living organism known as a "*superorganism*" (Pepper, 1996: 21). It is composed of interrelated parts that all regulate and balance this planet by various feedback mechanisms. The earth is viewed as a living organism that is self-healing and self-renewing. Various other green schools of thought exist, but the basic belief is that for a sustainable society to be created, total social reform is required, where a way of thinking is changed. As opposed to the belief that a person *ought* to care for the earth in achieving a deeper understanding of the earth's systems a person *will* be inclined to care for the earth (Roberts, 1990: 54). Caring will then be intuitive.

2.4.4. Solutions: Planning and Mitigation

Various attempts have been made over recent decades, by governments, developers, the public, and interested and affected parties, to mitigate the problems experienced from habitat loss and the fragmentation of open space. These methods have been employed worldwide and importantly in the city of Durban, South Africa, the chosen city of study for this dissertation. The following section describes the efforts made DMOSS and EIAs in assuring development is sustainable, and the short-comings of both in addressing the plight of indigenous wildlife.

(a) Metropolitan Open Space System (MOSS)

In response to diminishing open space in fast developing urban environments, many cities around the world have developed plans, in keeping with sustainable development, to preserve the pockets of land within the city.

Coupled with factors like connectivity, large core areas and habitat and species diversity, these land resources form an open space system, which allows for increased survival chances of both flora and fauna.

- **What is MOSS?**

A Metropolitan Open Space System is defined by the City of Johannesburg in its "Joburg Metropolitan Open Space System" (JMOSS) as,

"An inter-connected and managed network of open space, which supports interactions between social, economic and ecological activities, sustaining and enhancing both ecological processes and human settlements. MOSS comprises public and private spaces, human-made or delineated spaces, undeveloped spaces, disturbed 'natural' spaces, and undisturbed or pristine natural spaces" (Strategic Environmental Focus, 2002: 7).

Essentially, MOSS is designed to incorporate as many functioning ecosystems, with the widest range of land cover types and linking them physically (EB: DPSU, 1999). This will allow the remaining open spaces in an urban environment to continue functioning optimally and therefore preserving these spaces indefinitely.

- **Types of Open Space**

Within an urban environment, there exist different types of open space. The character of each of the different spaces differs and so to do their functions and benefits. These open spaces can therefore be categorised into different types with ranging functionality. The Ethekwini Municipality (2002) divides open space within a city into two broad categories.

These are urban open space (human designated space, developed for community use) and natural open space (undeveloped and undisturbed open space) (see Figure 2.3).

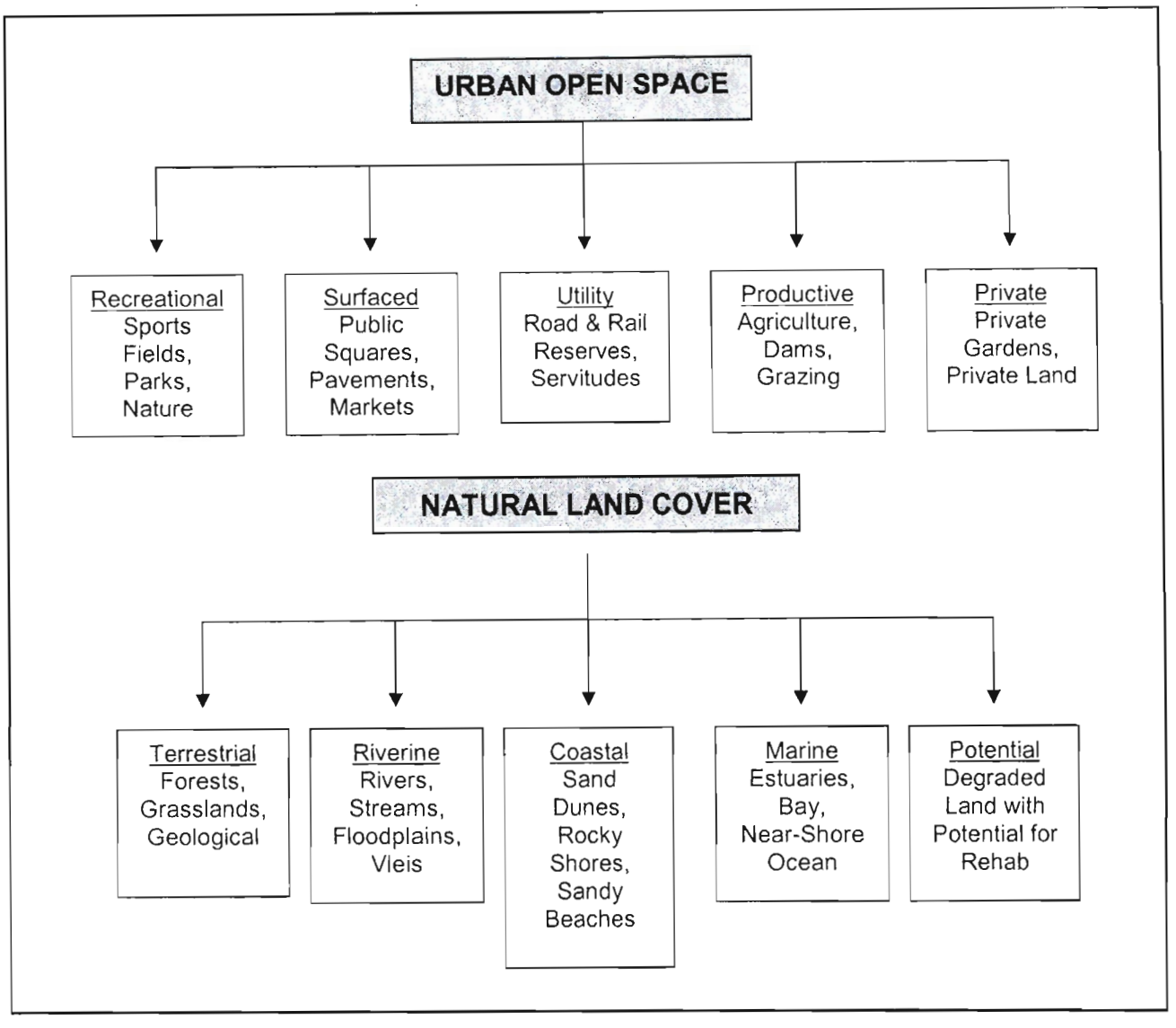

Figure 2.3: Open Space Assets (EB: DPSU, 1998: 4)

- **Categories of Open Spaces**

Management of a system of open spaces can only be achieved with the relevant information on each space and this requires all open space in an urban centre to be categorised. Three functional categories, for example, are used by the Ethekwini Municipality (EB: DPSU, 1999);

- Functional ecosystems: large open spaces which are ecologically stable, diverse and are mostly undisturbed by humans. These spaces are designated as *core* areas.

- Partially functional ecosystems: smaller tracts of land with a higher disturbance factor and limited ecosystem functions.
- Isolated pieces of ecosystems: small disconnected spaces, which can be utilised as links or corridors between functional and partially functional ecosystems.

· Design Principles

Because urban open spaces exist mostly as isolated pockets of land, as opposed to large tracts of land co-dependently existing, appropriate organisation of the land is imperative. This need is further emphasised by the effect of sprawling cities and the further reduction of open space. If not, the land may cease to exist as a functioning ecosystem and the value of the land as a habitat will be lost. As explained by Environmental Branch (1998) an open space asset should not merely exist but should function effectively to an optimal quantity and quality of services to a community. Shafer (1990) adds that our approach to this *island dilemma* should be systematic as too much is at stake and the old opportunistic *hit and miss* approach is no longer acceptable. The design of urban open space is important as it can either promote synergy and co-existence between species and their habitat, or allow disturbances to completely break down the functions of the space as an ecosystem.

· Island Biogeography and Urban Open Space Conservation

Many authors (Poynton & Roberts 1985, Shafer, 1990) have suggested that appropriate for the study of isolated urban open space is a comparative study of the data and ideas of biogeographers who have studied actual communities on off-shore islands. Findings of these studies presented on subjects like species number, habitat and species diversity when studying islands prove useful in the design or management of urban reserves or islands.

According to Shafer (1990) studies done on species immigration and extinction on islands, provided the basis for the *"Theory of Island Biogeography."* One of the most important theories proposed by island biogeography studies deals with the relationship between species and area, which proposes that as area increases, so to does species number. This relationship is given three possible explanations one of which is the *habitat – diversity* hypothesis that suggests that the amount of area sampled is proportional to the encountering of new habitats and associated species and there is therefore an increase in the number of species with area. The second is the *sample* hypothesis, which proposes that as contiguous area expands, the statistical chance of finding additional species increases, especially if species are rare or aggregated.

The *"Equilibrium Theory of Island Biogeography"* developed by MacArthur & Wilson (1963 and 1967) in Roberts (1990: 93) is the final hypothesis which suggests that "*the biota an on island at any point in time is a dynamic equilibrium created by a balance between occasional stochastic immigration of new species to the island and extinction on the island of species already present.*" The species number remains constant but the species composition varies and the rates of immigration and extinction can be attributed to different parameters. Immigration is inversely proportional to distance from the mainland and extinction is inversely proportional to island area.

While MacArthur & Wilson (Roberts 1990) may concede there are various other factors (i.e. habitat diversity, resource availability etc) that might influence species diversity, the model presented is significant when considering reserve design. The geometric design principles in Ellery (2001) and Roberts (1990), which were formulated based on the Equilibrium Theory of Island Biogeography, illustrate this.

- **Diamond's Geometric Design Principles**

Figure 2.4 illustrates the geometric design principles proposed by Diamond (1975) show six scenarios where species extinction rates are assumed to be lower for the reserve design on the right when compared with those on the left. Three main themes need addressing when tackling reserve design.

These are;

- The comparison of single large reserves when compared with one or several smaller ones (A and B).
- The optimal spatial arrangement of these reserves (C, D, and E).
- The optimal shape of reserves (F).

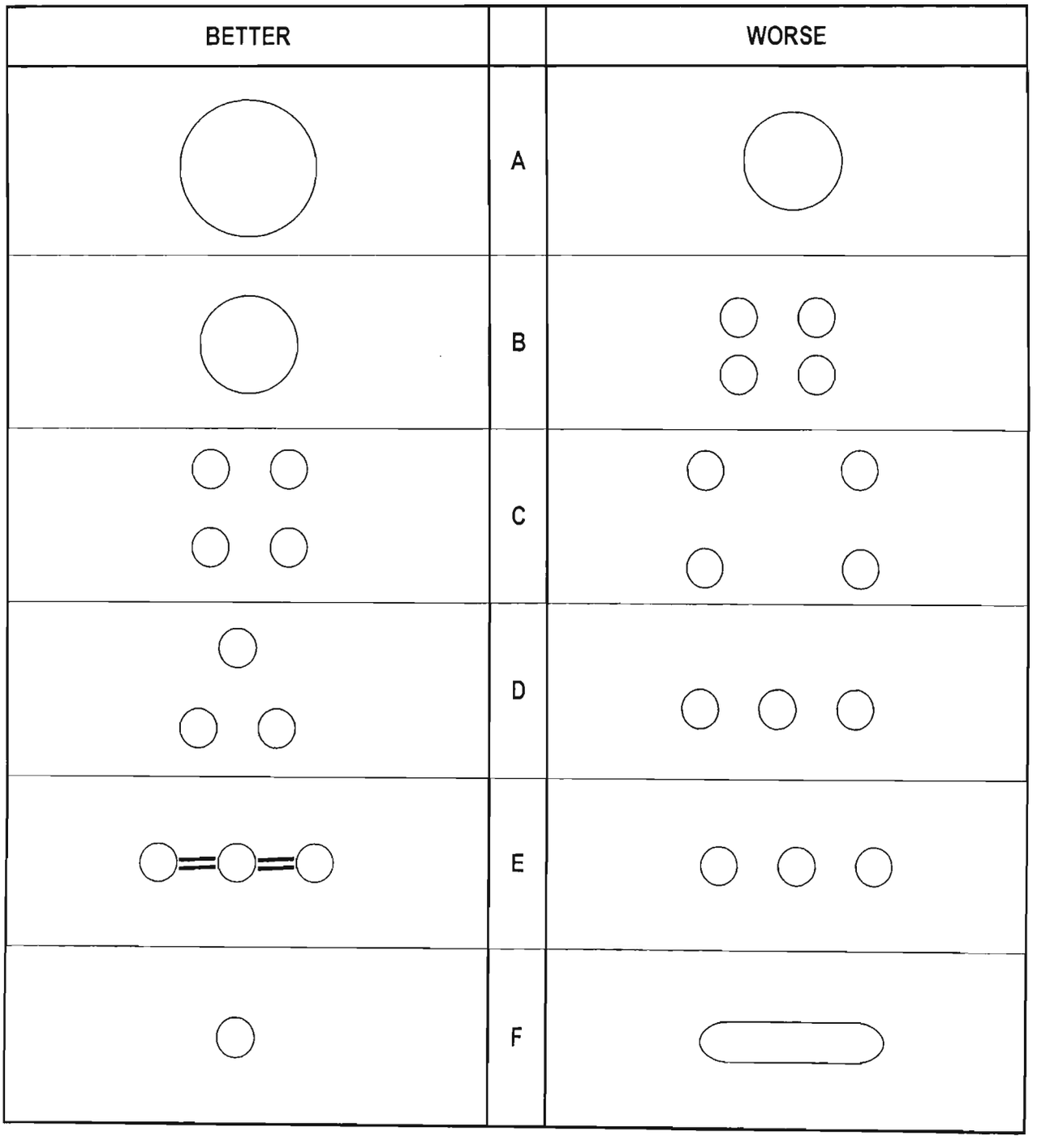

Figure 2.4: Diamond's Geometric Design Principles (Roberts, 1990)

How big should reserves be? Scenario A, which is self-explanatory accepts that a single large reserve is better than a single reserve of a smaller size as it promotes species richness and species diversity. The scenario presented in B, described as SLOSS (single large or several small) is more complex, but it is thought that the former is more optimal for similar reasons (i.e. species richness and diversity). Roberts (1990) explains that open space conservation aims to safeguard species diversity, not just species richness, and a large reserve as opposed to several smaller ones can do this more effectively. Shafer (1990) adds that in addition to maintaining habitat diversity more effectively, a single large reserve will allow a smaller edge effect. This will decrease the effects of unnatural human disturbance likely in an urban environment and the effects from successful invaders that can easily colonise the edges or ecotonal areas of a reserve. Smaller habitats are at such a great risk of being modified by edge effects that some are at risk of becoming complete *edges* (a) and (b) (see Figure 2.5).

According to Roberts (1990), there is a widely recognised lower limit or size, below which subdivision produces refugees and therefore population sizes are too small and extinction rates subsequently increase. A *minimum critical area* is therefore required. This is because species often have their own habitat requirement for reasons like an extensive home range, successful breeding and seasonal food supply.

Scenario C in figure 2.4 demonstrates the proposal of the Theory of Island Biogeography that reserves closer to the mainland will have higher colonisation rates and therefore a greater species number. Roberts (1990) adds that there will be a greater "rescue effect" (inflow if new individuals from mainland that reduces extinction) for reserves in close proximity to each other and the mainland, as the gene flow is enhanced and the input of new genetic material stabilises the "island" populations and promotes species and genetic diversity. The spatial clustering presented in D in Figure 2.4 is such because the end spaces in the *worse* column become ecologically isolated and experience none of the advantages described above from contact with other reserves or a mainland.

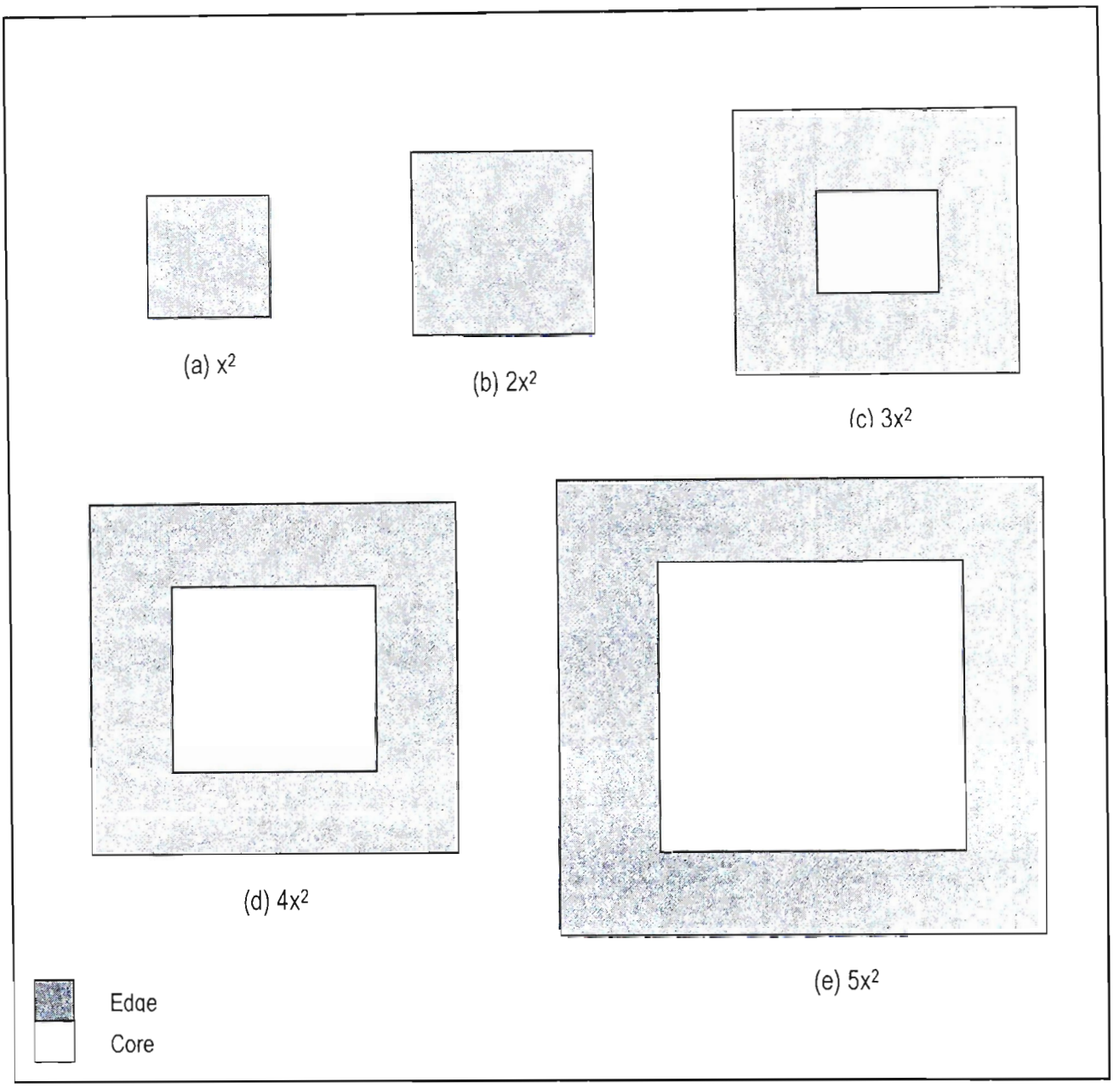

Figure 2.5: Edge Effects on Core Conservation Areas (Roberts, 1990)

One of the most important aspects of design deals with the use of corridors. A corridor is a "*route that allows movement of individuals or taxa from one region to* another" (Shafer, 1990: 151). E in Figure 2.4 shows three reserves linked by passages that allow the dispersal of fauna and fauna between core reserves and main lands. This again promotes genetic and species diversity and species richness. The species turnover rate with corridors, is higher the rate without corridors.

Finally, the shape of reserves is addressed in F in Figure 2.4, where a circular shape is considered more favourable than a longitudinal shape. This reason is the same as that for D, where the outlying areas of a reserve might suffer ecological isolation and will not function as a proper ecosystem. In addition, extinction might outweigh colonisation so much that these outlying areas may cease to function as an ecosystem entirely.

- **Biosphere Reserve**

Shafer (1990) introduces the concept of a "biosphere reserve" which promotes the sound use of adjacent lands, which decreases the probability of isolation and protects the ecologically sensitive core of the reserve by a low impact land-use buffer. A core is the pristine ecosystem surrounded by a buffer, "*a collar of land designed to filter out harmful influences from surrounding activities*" (Shafer: 1990: 151). The high impact land-uses (i.e. industrial or commercial can be located outside the second buffer.

- **Conclusion**

It can be clearly seen by the extensive literature available on the subject, that deep thought has been placed on the effectiveness and implementation of MOSS. Although MOSS does not explicitly cater for indigenous wildlife, its role in the preservation of wildlife habitat is invaluable. Essential to the functioning of MOSS is due consideration for the design principles outlined above to provide suitable functioning ecosystems for urban wildlife to inhabit.

(b) Environmental Impact Assessment

Over the last few decades, the growing interest in the welfare of the environment and a new awareness of the impacts of development on the environment prompted a call for proper holistic planning prior to development, in a hope that these impacts would be reduced or mitigated.

In 1969, these vociferous concerns led to the promulgation of the National Environmental Policy Act (NEPA), which enabled long-term planning for development in the United States. This procedure used for identifying and investigating the environmental consequences of development to aid in decision-making, was recognised world-wide as the formal inception of an Environmental Impact Assessment (EIA) (Fuggle *et al.*, 1995). Subsequently, Environmental Impact Assessments (EIA) systems were developed in various forms throughout the world, starting with the more developed countries and moving to the developing ones.

An EIA is defined by Wood (1999: 52) as "*the evaluation of the effects likely to arise from a major project (or other action) significantly affecting the natural and man-made environment.*" The process aims to provide adequate information to allow relevant authorities to reach informed decisions regarding development, ultimately meeting the goals of sustainable development.

Although Makhaye (2002) confirms that informal EIAs were being performed in South Africa from as early as 1974, formal EIA procedures were not required until the late nineties. The EIA Committee of the Council of the Environment was set up in 1983 and subsequently, a document outlining the non-statutory Integrated Environmental Management (IEM) procedure, was published. The IEM guidelines formed the basis for a substantial number (several hundred) of voluntary EIAs in South Africa, but EIAs were still not formally required by law, and plans to integrate EIAs and planning, was met with much resistance from planners (Wood, 1999).

With continued pressure to implement EIAs in development, the EIA regulations were in the Environmental Conservation Act of 1989 became compulsory by law 1997, with formal guidelines published in 1998. Makhaye (2002) adds that at this point, the EIA evolution process was still not complete as after the introduction of the National Environmental Management Act of 1999 (NEMA), the Department of Environmental Affairs and Tourism (DEAT) initiated a process of law reform in the year 2000.

EIAs are therefore "*more integrated and strategic in approach, applied to increasingly more complex problems and increasingly linked to broader planning and regulatory frameworks and tools*" (Makhaye, 2002: 16). EIA regulations place much emphasis on public participation and consultation, but still do not stipulate follow-up procedures like auditing, monitoring and environmental management.

In essence, an EIA is "*a process, a systematic process that examines the environmental consequences of development actions*" (Glasson, 1999: 4). It seeks to proactively assess the impacts of development on the environment and uses alternatives or mitigation methods to minimise these impacts. There is a great emphasis placed on a multi-disciplinary, systematic and holistic approach to planning and development, which was ignored in past attempts at planning.

The are many functions that an EIA serves. For one, it acts the main decision making reference to the relevant authority involved in decision making. The decision on whether or not a particular development projects goes ahead or if modification is required, may depend solely on the results of an EIA. The Environmental Impact Report (EIR) provided at the end of an EIA does not provide a judgement or decision to the decision-maker. Instead, it presents the technical and non-technical aspects of the development, states the impacts (both positive and negative) and lists the potential trade-offs that the development would entail and ultimately allows the relevant authority to make an informed decision. In addition, while an EIA may seem like a tedious process to a developer, it can in fact make the development process easier because it provides the developer with a framework for development.

Ultimately, an EIA acts as an instrument for achieving the goals of sustainable development (Glasson, 1999). An EIA considers all aspects of the biophysical and social environment pre and post development. This proactive method of mitigation, avoids the identification of potential disasters post development, when little or no mitigation can be preformed. It employs the precautionary principle as well as duty of care, where the developer is obliged to engage in a risk assessment (Makhaye, 2002).

Of particular interest is the provision made by an EIA for indigenous fauna and for open spaces (as a habitat to wildlife). Section two of the EIA guidelines describes a list of activities that would require an EIA. Of these activities, none pays particular reference to activities that affect the wellbeing of indigenous fauna. In terms of animal habitats, reference is made to land that will be developed where it is currently in use for nature conservation or zoned open space (Department of Environmental Affairs and Tourism (DEAT), 1998). In addition, canals and channels, which divert water flow and dams, levees and weirs, which affect the flow of a river, are also listed. These areas often act as corridors for animals between habitats and are therefore significant.

Important is Appendix 3 of the EIA guidelines, which list the international environmental conventions and protocols that the country is a signatory to. In this case the guidelines (DEAT, 1998) document states "*in cases where the proposed undertaking of an identified activity may influence of affect compliance to these conventions or is likely to have a significant detrimental effect across South Africa's international boundaries, special procedures and EIA requirements may be required.*" Important to fauna are conventions like the Ramsar Convention (Convention on Wetlands of International Importance especially as Waterfowl Habitat) and The Bonn Convention (Convention of Migratory Species of Wild Animals). Of particular importance to indigenous fauna and biodiversity is the Convention on Biological Diversity (CBD) and CITIES (Convention on Trade in Endangered Species of Wild Fauna and Flora), where the South African Vervet Monkey is listed under appendix two, where the species is of low-risk or least concern (EKZNW, 2004) (discussed later).

Specialist studies are undertaken during an EIA, and a specialist employed to address the concern of indigenous wildlife or their habitat, being impacted on. Other than these provisions, however, there are no explicit provisions or stipulations regarding indigenous fauna and how they should be dealt with in the event of habitat removal or other impacts.

It might be argued that the process of an EIA is in keeping with the principles of sustainable development and therefore it is expected that in due course the plight of an indigenous animal will be addressed. This assumption, however, is a loophole in the effectiveness of the EIA when dealing with indigenous fauna. As will be discussed later, impacts that do not arise directly from development (i.e. long-term and secondary impacts) are often ignored during an EIA unless highlighted by a concerned individual. The implications of this failure to directly address the plight of indigenous fauna will be questioned in the interview component of this dissertation.

2.4.5. Conclusion

Development in urban ecology and conservation has gathered momentum in the last century and the development of tools for preservation of urban open space and sustainable development is promising. Urban wildlife, however, is largely ignored and it appears that planners and authorities are hoping that the *problem* will just go away. The responsibility of these animals is not clearly designated leading to problems for both the animals and the residents encountering them. The following section will explain plight of the problem animal and methods currently employed by authorities and residents in controlling them. A case study is also presented on Cougars of the Orange County, United States.

2.5. Problem Animals

2.5.1. What Exactly is a Problem Animal?

While there is no widely used, common or legal definition of a *"problem animal,"* EKZNW (2004: 7) defines a problem animal as "*an individual animal or few individuals that either cause an economic loss (e.g. crop or damage or damage to property) or is a real threat or nuisance to man.*" It is important to note that no explanation of the term "real," when referring to the threat posed by problem animals, is mentioned in the above definition. A problem animal, however, can be described as one that is seen as a nuisance to humans, animals that infiltrate the orderliness and containment of an urban area.

The phenomenon of problem animals is common to numerous urban or suburban centres around world with different communities and wildlife affected, and varying reactions by the public in an attempt to deal with these uninvited guests. There are a few causes of this increased interaction between humans and wildlife. Important is the increase in urban expansion and sprawl, which encroaches on the territory of certain wildlife. As a response to this many animals change and adapt their behaviour to the new conditions and in some cases thrive, as the new conditions are more favourable than before (e.g. access to food and shelter).

In addition, Clergeau *et al.* (2001: 451) explain that "*Today, to improve quality of life, people want "greener" cities with more trees, parks and animals.*" Urban planners are therefore under pressure to increase nature in towns, which in turn attracts wildlife, which are then difficult to manage (i.e. birds and mammals). It is believed by many (McKee, 2003; Fichit, 2004, pers comm.) that the problem is compounded by people who empathise with these animals and feed them. McKee (2003) believes that feeding animals in an urban environment will set up an unnatural food chain that affects a number of other animals across the food chain, including predators.

The resulting settlement of urban animals causes many problems in the eyes of the urban residents. These interactions can range from not so serious to risky and dangerous. Bird droppings and noise are some less serious offences committed by urban wildlife (Clergeau *et al.* 2001) and the theft of food from gardens homes are more serious but not entirely dangerous. Animal-borne diseases (Glick & Peyser, 1996), however and the mauling of humans by predators like cougars (O' Neill, 2000) are unsafe and need to be addressed. And although acts like the theft of food from gardens is relatively harmless to humans, it is potentially fatal for the animals as irate humans may choose to "deal" with the animals on their own, and this includes actions like shooting (The Mercury, 2000) and poisoning (Allen, 2001). Reviews of literature dealing with problem animals have suggested numerous techniques for their management and control, each with varying degrees of success.

2.5.2. Methods of Control of Problem Animals

Despite the large number of cases of animal-human conflict in urban areas around the world, very few of these cases process any workable solution to the problems experienced, or provide recommendations for the control and management of the animals. Generally authorities will use various methods of their own in an attempt to deal with complaints from the public (see Table 2.1), and the public themselves will employ various methods to try to handle the problem on their own, sometimes with dire consequences.

Not listed in the table as a possible solution is the contentious issue of *feeding stations,* as it is difficult to obtain a consensus on this topic. Feeding stations are points set up by concerned citizens to provide food for the monkeys who feel are lacking in food resources. Some literature (Justice for Animals, 2005; Wilson, 2003) does not advocate the use of feeding stations. This stance is taken because a feeding station will encourage monkeys to concentrate in one area and the monkeys will become accustomed to a regular food supply and will discontinue foraging. Other reports (van Wyk, 2003) explain that feeding stations prevent monkeys from becoming a nuisance, as they do not need to enter homes to find food. Justice for Animals (2005) advocate feeding only when other options have been exhausted and monkeys need to be drawn away from sensitive areas.

Incensed urban residents and other individuals often decide to take the law into their own hands and deal with problem animals on their own. The need for comprehensive legislation dealing with these animals is highlighted in this respect as these clashes can often become hostile with the animal often on the losing side. Reports of trapping and poisoning are common and in extreme cases, shooting occurs (with either a pellet gun or firearm). Sometimes the animal is killed, but often just injured and becomes more of a problem then previously as an injured animal is disorientated and can carry diseases in its wound (Thusi pers. comm., 09/11/04; Butler pers. comm., 01/11/04). Road accidents are also common in urban areas.

Table 2.2: Some Methods Employed by Wildlife Authorities for the Control of Problem Animals (Cooper, 2003; IUCN, 2002; Glick & Peyser, 1996; Fichit, 2004, pers comm.; Gullo *et al.*, 1998; Gaines, 1999; SF/SPCA, 1999).

Method	Description	Success Rate
Trapping	Traps are set along the usual path of the animal in a residential area, and once it is trapped, an official person releases it into the wild.	Works well with individual animals not problem groups, and often injures the animal.
Relocation	Entails trapping a animal or group of animals and releasing them into a sanctuary or wild space away from the urban area.	Successful in some cases where is new habitat is similar to old one and where the biological system will not be tampered with. Sometimes animals do not adapt properly to the new environment and often a whole group or troop of animals cannot be caught. Not a long term solution
Hunting	Sometimes a government will authorise a hunt (or series of hunts) of the animal in question to curb its numbers. In some cases permits are issued allowing homeowners to shoot animals entering their yard.	This method is considered inhumane and unnecessary and does not solve the problem.
Sterilisation	A number of one sex of the animal is captured and sterilised making them unable to breed in the future. In some cases they are shot with contraceptive darts.	This is an effective short-tem solution, as population numbers will be curbed. Again, not a long term solution.
Frightening	Some authorities have been known to use methods to imprint negative associations of human contact on animals (called hazing).	This method is only traumatic to the animal initially and is more humane than most methods. It has shown some degree of success with cougars and bears.
Trenches	Some nature reserves construct trenches around their boundaries to keep animals in the reserve.	This method is very useful for confining animals to a particular space, although some animals (i.e. Primates) do learn to get around them.
Education and Awareness	Involves a series of methods to increase awareness and educate people on co-existence.	Considered by most as most effective method. Can decrease exaggerated fears.
Reservation of land	Most countries area designed nature reserve systems to house animals and preserve habitats.	Essential with the unchecked rates of urbanisation. Although not the ideal, with assist in confining animals and conservation.

2.5.3. Lessons from Cougars: What Do You Do with a Mountain Lion in the Middle of Santa Monica?

Gullo *et al.* (1998: 139) in their text "The Cougars Tale" explain, "*Post-war urban growth in the United States was predicated on the ability of people to control nature and exclude wild animals from cities.*" Despite the increase in animal rights activism and rising concern over habitat loss, the conversion of land occurred at a rapid pace with the traditional rural-urban conversion replaced by wildlands-urban conversion. Predictably, clashes between humans and wildlife occurred and unfortunately, cougars were one of these animals.

- **Development of Orange County**

"The *real estate boom made [the cougar attack] inevitable... For lions always will behave as lions, and developers as developers. And there seems to be no outrunning either species*" (Gullo *et al.*, 1998: 142).

Orange County was as recently as the 1950s, categorised as rural with a relatively small population of about 200 000 residents. Rapid decentralised and a population boom, led to the sudden development of the area and by 1990 the county consisted of a diverse economic base with a population of 2.4 million sprawled across the county. Cougar habitat was fast reclaimed and soon became a mix of urban area, farmland and fragments of wilderness, all of which resulted in an increase in Cougar-human interactions. Cougars are typically accustomed to wild mountain areas, with off-spring seeking out fringe areas for hunting practice. In addition, cougars require a large home range, as they move away from the birthplace before settling on a habitat.

- **The Cougar Controversy**

Cougars were often sighted in urban areas, especially around parklands and highways, and the number of cougars killed increased from four per annum in the 1970s to twelve in 1984, mainly from road accidents.

In addition, there was an increase in Cougar sighting in suburban yards, and by the 1980s and early 1990s attacks (fatal and non-fatal) on humans were reported, and attacks on pets from Cougars were on the increase. Fear for human safety led to calls from gun lobbyists to allow hunting of cougars in an attempt to reduce their numbers, while animal activists fought to protect the cougar's non-game status.

While Cougars carried a bounty in the early twentieth century, their status changed in the 1960s to "non protected mammal" with no bounties paid for hunting. This status changed again in 1969 to "big game mammal" and hunting regulated to specified hunting seasons. Soon, however, the state estimated the cougar population to be decreasing. With the promulgation of the Endangered Species Act of 1973 and the Assembly Bill 600, which mandated an investigation into the state cougar population, the status of the mammal changed once more to "protected non-game animal," which included a four-year moratorium banning cougar hunting extended to 1986. While pro-hunting agencies lobbied for the reinstatement of cougar hunting legislation, the Mountain Lion Foundation, a non-profit organisation, vociferously opposed the proposals and called for decision-making power to be removed from the hands of the bureaucratic Department of Fish and Game. This pressure resulted in the California Wildlife Act of 1990, which brought back protection status for the cougar and allocated thirty million dollars annually for the protection of wildlife habitat until the year 2020. The perceived "mushrooming" of the cougar population and fatal encounters between humans and cougars (human deaths) led to an outcry by the public and plans to legalise cougar hunting once again. The decision was ultimately left in the hands of public voters, who were issued with a voter information package colourfully stating both sides of the argument in order for them to make an informed decision.

Proponents of hunting emphasised the danger of cougars, the cost of livestock replacement and the upsetting of the ecologically balance of the area, by hungry cougars depleting deer and elk herds. Opponents emphasised the cruelty of trophy hunting and sought to discredit the gun lobbyists and their affiliates, instead of using the "habitat – loss" argument.

- **The Media**

"*Along with the eagle, the bear, the wild river and the far mountain peak, the lion is a symbol of our dwindling wilderness heritage that deserves respect and protection,*" (Los Angeles Times quoted in Gullo, 1998: 149).

"*It is fast and silent and kills its prey by slicing its fangs between the neck bones, snapping the spinal cord... With increasing frequency, North America's most efficient four-legged killer, the mountain lion, is prowling areas that human beings think of as their domains: suburban neighbourhoods, urban open spaces, sometimes even shopping malls,*" (Smith (Los Angeles Times) quoted in Gullo *et al.*, 1998: 149).

Representations of the cougar debate, like these, were regularly presented in the media, and believed by Gullo *et al.* (1998) to have contributed to the social construction of nature (cougars in this case) in the minds of urban residents. The Los Angeles Times, the most widely circulated paper in the state, ran seventy-nine items on cougars between the mid 1980s and mid 1990s. According to Gullo *et al.* (1998: 149) the Times, was "*a vital source of understanding about the dynamic renegotiation of nature/society relations serving to purvey social constructions of animals and thereby shaping public attitudes and policy alike. Like other media texts, Times coverage also reflects public attitudes through distribution of the knowledge, attitudes and positions of public actors such as politicians and scientific experts, and the views of a mix of the general public.*"

The articles printed in the media ranged from positive (in favour of cougars) to neutral and then negative (against cougars). The tone of the articles peaked at different times (usually at times of attacks or policy decisions) and varied according to public support for or opposition against cougars. While the overall coverage was positive, and the proposition to resume cougar hunting rejected, Gullo (1998) notes that support steadily diminished over time, evidence of the declining support for lions over time, particularly with the increase in human-cougar interactions.

- **Constructions of Character**

Changing representations of cougar character reflected the change in public assessments of the cougar and its "*moral worthiness for continued protection by the state*" (Gullo, 1998: 153). While articles that showed support for the cougar in the media used terms like "*majestic*" and "*beautiful*" linking it to aesthetic values, negative articles attributed the attacks by cougars to its "character" (see Table 2.3). Terms like "*serial killer*" and "*lean, mean, killing machine*" were graphic, designed to evoke brutal images of an animal that *kills for fun*.

Table: 2.3: Terms Describing Cougar Character / Behaviour in Los Angeles Times (Gullo, 1998: 153)

Negative Terms	Positive Terms	Neutral Terms
One of nature's finest killing machines	Symbol of dwindling wilderness heritage	Animal
North America's most efficient four-legged killer	Indigenous, rapidly vanishing wild creatures	Creature
Killer-animals	Magnificent wild creature	Predator
Serial killers	Spectacular looking	Mountain lion
Increasingly aggressive population of predators	Elusive and fascinating	Panther
Prince of predators	Innocent	Cat
Lean, mean, killing machine	Majestic	Big cat
Wayward	Beautiful	Roamer
Big troubles	Proud	German-shepherd-ized lion
Roaming like phantoms		Natural resource
Wildest of the wild		California's resource
Menace		Loner

- **Lessons Learned**

Like the renegotiation of human-cougar relations, often the case of problem animals in an urban area has to seen in a broader political and economic context. Often, the problem animal scenario is set against a backdrop of economic recession, and a pro-development atmosphere. Pressure for this development and the lack of funding for conservation of species and habitat are contributing factors to the problem, along with the media, which greatly influences the public's perception of the animals.

Important is the correct education of humans on the exact scientific characteristics of the animal and action to be taken when they are encountered. In addition, committees to deal with the problem need to clearly designated; a committee that is answerable for the welfare of the animals and problems thereof.

2.6. Conclusion

This chapter has outlined the effects of urbanisation and the historic treatment of animals by humans from the earliest settlements. A pattern was identified, showing clear control of nature and subjugation of animals over the change of centuries. Last century developments of environmental movements and animal discourses, with locally applicable tools for urban open space preservation have promoted progress in wildlife conservation. Interaction between wildlife and humans in an urban area is a reality, however, and long-terms solutions are required for an ever-increasing problem. The following chapters, using a study area and various data collection techniques, will search for and assess potential solutions to the problem.

CHAPTER THREE
A SOUTH AFRICAN CONTEXT

3.1. Introduction

From the previous chapter it is evident that habitat destruction and fragmentation and the subsequent conflict between urban residents and animals are a world-wide phenomenon. The management solutions to these problems however differ between countries and cities. In this chapter focus is narrowed to the city of Durban (eThekwini Municipality) and its own DMOSS plans and battle with problem animals. Discussed, is the service plan put in place by the Environmental Management Services Unit of the city, to effectively implement open space planning. The focus then turns to one specific *problem animal* in the city, namely the Vervet Monkey, its taxonomy, distribution, characteristics and status as an indigenous South African wild animal.

3.2. Durban Metropolitan Open Space System

Open space planning is not new to the city of Durban. The first steps initiated to incorporate open space into city planning were initiated over twenty years ago and has since been an on-going and constantly refined process. The following account outlines the evolution of the metropolitan open space system in the city of Durban reviewed in the Durban Environmental Services Management Plan (Environmental Management Branch, 2002).

3.2.1 Phase 1 (1979): Metropolitan Open Space System (MOSS)

This was an initial attempt at city-wide open space planning by members of the Wildlife Society, who were concerned at the loss of open space to *ad hoc* city development. The simplistic MOSS plan basically delineated areas worthy of conservation, a plan which was further refined by the Natal Town and Regional Planning Commission in 1987.

3.2.2. Phase 2 (1989): Durban Metropolitan Open Space System (D'MOSS)

The city of Durban in conjunction with the University of Natal, Durban carried out an evaluation of open spaces within the city. The subsequent D'MOSS report, produced by the Director of Parks, Beaches and Recreation, recommended that an open space system be formed incorporating nine park systems from within the municipality. There was major focus on the design, particularly its ecological viability and sustainability.

3.2.3. Phase 3 (1999): D'MOSS Framework Plan

Following the democratic elections of 1994, the development of local government and the city's commitment to LA 21, there was shift away from ecological viability and conservation as the primary focus of D'MOSS, to the need for the implementation and management of a socially, economically and environmentally sustainable open space system (Environmental Management Branch, 2002). Open spaces were re-conceptualisation as important assets and evaluated on this basis. Resource economics models were used to quantify open space, while GIS was used to map them, dividing them into categories and developing a thorough framework for their management.

3.2.4. Phase 4 (2001): eThekwini Environmental Services Management Plan (EESMP)

The year 2000 saw an extension of municipal boundaries and thus an increase in the city's open spaces. Once these additional spaces were mapped and quantified, planning, environmental and legal professionals were appointed to develop tools that would successfully manage the open space system. Using national and international best practice, the system categorised open space into different land-use types and categories and looked further at adjoining land-uses, aiming to utilise tools like property rates rebates, environmental charges and land acquisition to secure land and manage the system. Importantly, the framework followed rigorous design principles to promote sustainability, allowing open spaces to function as effective ecosystems.

The plan ensured that the following structural elements were considered for the design of the system: core conservation areas (existing nature reserves and potential core conservation areas), linkages and corridors (river, coastal, marine and transport) and buffers (low density formal residential and major recreational areas) (see Figure 3.1.).

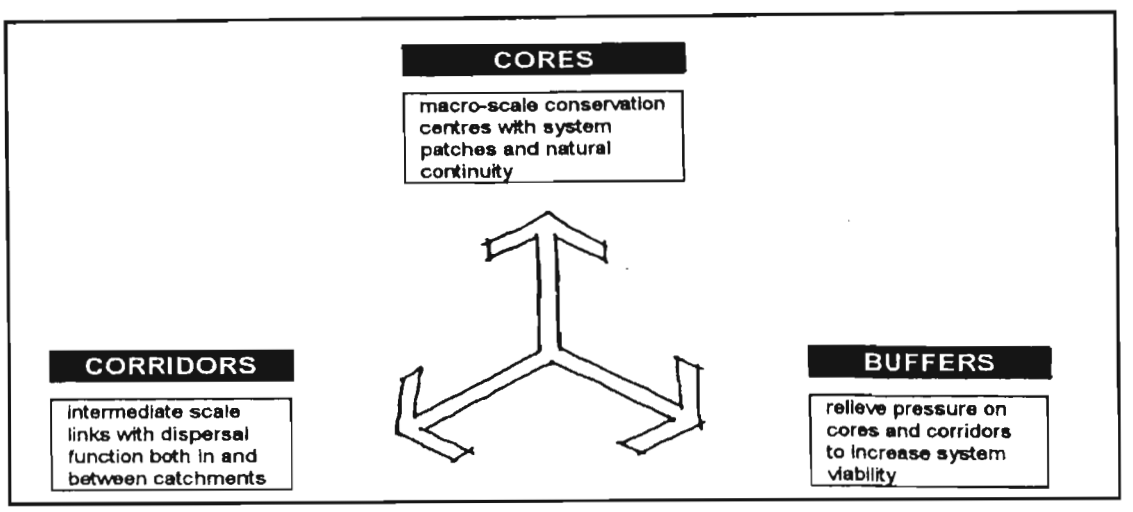

Figure 3.1: Conceptual Structuring Element of the D'MOSS (Environmental Branch, 1998)

3.2.5. Phase 5 (2002): Programme To Secure the Open Space Asset

Changes in the ecological status of some open space have resulted in the need for re-mapping of city's open space system, a process that was assisted by the advancement in aerial photography. During this phase areas of high priority (ecologically sensitive) were highlighted and zoned for special protection. A plan was developed to attend to threatened areas by informing land owners and tribal leaders of their legal responsibilities in protecting sensitive land and acquiring tribal authority land and establishing area-based agencies for the management of open space assets.

3.2.6. Current Progress (2005 / 6): The Biodiversity Working Forum

The Biodiversity Working Forum was developed in late 2005 with a broad aim of assisting the municipality in developing a strategy for the management of biodiversity.

The first meeting of the forum was held on 12 October 2005 and discussed the potential role and objectives of the forum. Issues of interest included biodiversity issues, climate change and conservation (see Appendix 3.1). The forum aims to meet quarterly and its formal form and role within the municipality will be specified at the next meeting in late January 2006.

While efforts to maintain a healthy metropolitan open space system and suitable habitats for the conservation and protection of indigenous fauna have been organised, conflicts between humans and monkeys are a reality. It is therefore necessary to examine the characteristics of these "problem animals" including the traits that make them so highly adaptable. The following section provides a brief description of Vervet Monkeys along with their distribution, favoured habitat and qualities that make them more adaptable than many other indigenous fauna species.

3.3. *Cercopithecus aethiops pygerythrus* (Vervet Monkey)

"*While the primates comprise of only one of the several orders into which the class of mammals is divided, the group is of surpassing significance because man himself is classified with this order*" (Tollman, 1984: 9)

3.3.1. Taxonomy and Classification

Tollman (1984: 10) classifies the Vervet Monkey according to the classification system documented by Prudence Napier in 1981.

Order:	Primates	Linnaeus	1758
Suborder:	Anthropoidea	Minvart	1864
Superfamily	Cercopithecoidea	Gray	1821
Family:	Cercopithecidae	Gray	1821
Subfamily:	Cercopithecinae	Gray	1825
Tribe:	Cercopithecini	Gray	1821
Genus:	*Cercopithecus*	Linnaeus	1759
Species Group:	*aethiops*	Linneaus	1758

The family **Cercopithecidae** consists of two subfamilies, **Colobinae**, which refers to leaf-eating monkeys including African (*Colobus)* and Asian (*Presbytis)* monkeys. The second subfamily is **Cercopithecinae**, which includes the guenons (*Cercopithecus*, *Allenopithecus*, *Miopithecus* and *Erythrocebus*), macaques (*Macaca*), mangabeys (Cercocebus) and baboons (*Papio*, *Mandrillus* and *Theropithecus*). The two subfamilies are distinguished by the procession of cheek pouches and the absence of a fermentative stomach which is adapted to leaf consumption, in the latter of the two subfamilies (Baldellou, 1991).

The genus *Cercopithecus* includes a larger number of species than any other Anthropoid genus (Baldellou, 1991) and *C. aethiops* seems to be intermediate in adaptation and structure between the terrestrial patas monkey and the forest dwelling guenons. The species *aethiops* further divided by Napier in Tollman (1984) and Fedigan and Fedigan (1988) into four subspecies according to distribution and slight morphological variation.

Northern:		
C. aethiops sabaeus	Green monkey	1 subspecies
C. aethiops tantalus	Tantalus monkey	3 subspecies
C. aethiops aethiops	Grivet monkey	4 subspecies
Southern:		
C. aethiops pygerythrus	**Vervet Monkey**	14 subspecies

3.3.2. Basic Description

Fedigan and Fedigan (1988) describe Vervets as small monkeys compared to other semi-terrestrial *Cercopithecidae* living in open habitats, with a sexual dimorphism fairly moderate in size. An average adult female weighs 5.6 kilograms compared with a marginally higher 7 kilograms for an adult male. Black hands and black feet are characteristic of a Vervet along with a turquoise-blue scrotum, red sub caudal patch with a black tip on the tail, a broad white band on the brow with white whiskers that blend in with the crown (see Plate 3.1). In addition a Vervet has a red penis and white hairs surrounding the red peri-anus and pronounced cheek pouches (Baldellou, 1991).

Plate 3.1: *Cercopithecus aethiops pygerythrus* (Vervet Monkey) (Warner, 2003)

3.3.3. Distribution

Baldellou (1991) explains that guenons are indigenous to Africa and different species are confined to specific areas of the continent. *Cercopithecus* monkeys are considered by Tollman (1984) to be the most abundant monkeys on the continent. *C. aethiops* are distributed widely from Senegal to Somalia and south Sahara to South Africa (see Figure 3.2). As previously mentioned, the wide distribution of *C. aethiops* explains the variation in local morphology and accounts for the classification into four subspecies described above.

The *C. aethiops pygerythrus* group, or Vervet group, extends from Ethiopia to the Cape of Good Hope, (see Figure 3.2) (Tollman, 1984). Fedigan and Fedigan (1988) reiterate the abundance of this subspecies as it is distributed over all of Africa's savanna and woodland areas with the exception of the Congo basin, the deserts of Northern and Southwest Africa and a few coastal areas. Distribution is South Africa is wide. According to Baldellou (1991) Vervet's occur as far south as the coast of Eastern Cape and George and Knysna in the Western Cape.

They do not occur in dry sand-plains and Karoo regions with the exception of the valleys of the Orange and Vaal rivers. Vervets are widely distributed throughout KwaZulu-Natal.

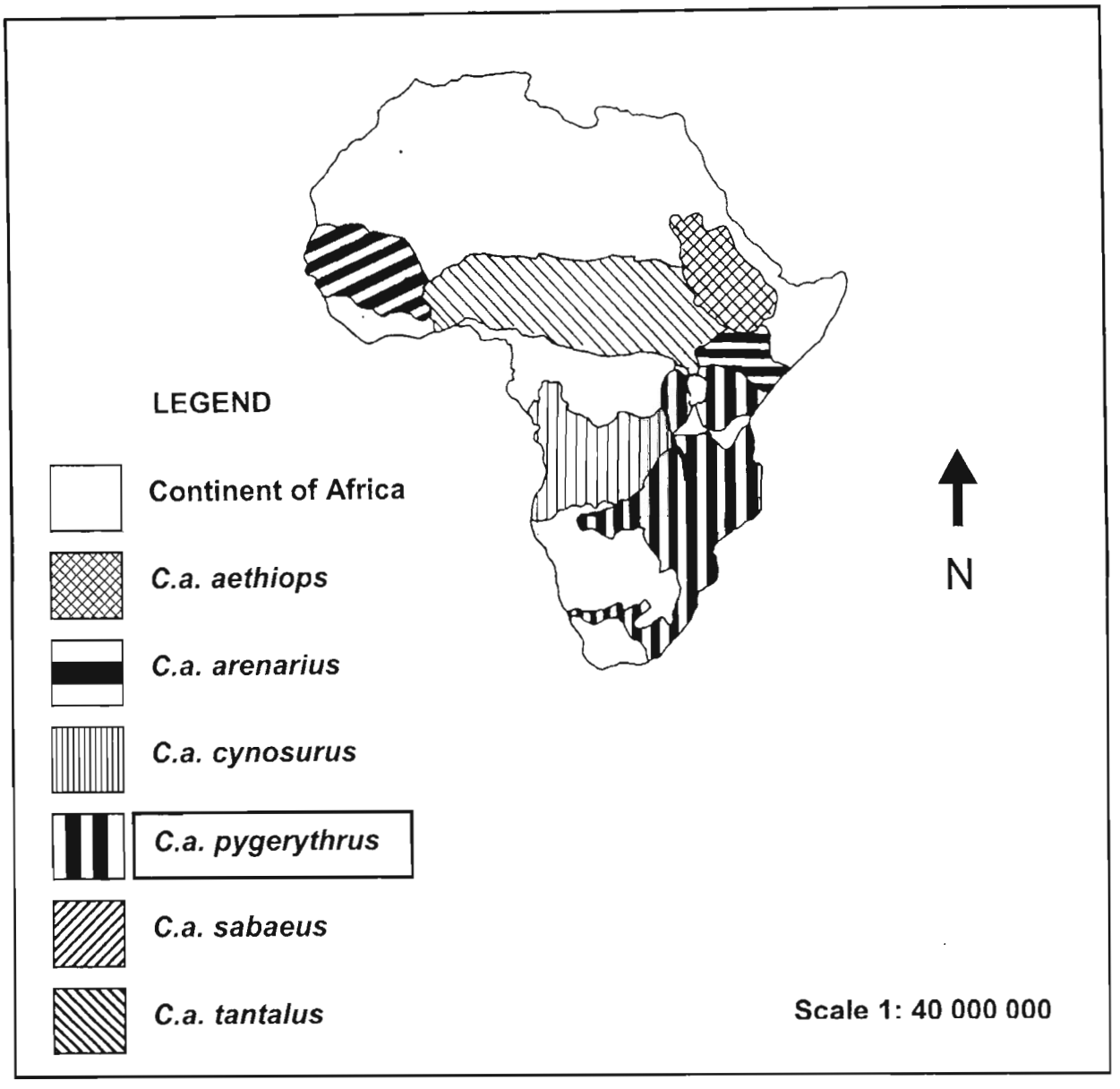

Figure 3.2: Distribution of *Cercopithecus aethiops* in Africa (Baldellou, 1991: 5)

3.3.4. Habitat and Adaptability

Being mainly arboreal species, Vervets tend to spend most of their time shifting through dense savanna woodland intermittently descending to the ground to forage. They are commonly found on the fringe of the forest adjoining a grassland, where foraging can be done in the safety of the shrubs of the grassland.

Fedigan and Fedigan (1988) stress, however, that the Vervet Monkey is highly adaptable and sometimes exhibit semi-terrestrial and semi-arboreal characteristics making foraging both on the ground and in trees easy. So despite being commonly found in a habitat similar to the one described above, Vervets are also found in a variety of *marginal* habitats. Their only limiting factors are water availability and the need for trees for sleeping. Movement to disturbed areas such as farms and special areas such as mangrove swamps is also common. Tollman (1984) believes the adaptability of the Vervet Monkeys is due to anatomy. The length of the arms are unique in that they are intermediate between two more specialised species making the Vervet a semi – terrestrial and semi – arboreal animal and able to adapt to both dry savanna and forest and woody environments. Their diet ranges from low quantity fibrous foods to soft fruit, flowers and seeds, and although largely vegetarian they can be described as opportunistic (Fedigan & Fedigan, 1988).

Vervet Monkeys time their breeding season with the availability of resources and this leads to a low infant mortality rate. In addition, the somewhat versatile social organisation of Vervets makes it a flexible species in terms of movement and adaptability. Fedigan and Fedigan (1988: 407) concluded that "*the ability of Vervets to perceive, communicate, and act upon taxonomies of external objects and social others, is an asset to this species which specialises in flexible, opportunistic interactions with a changing environment, but which maintains cohesive relatively standard social structures under a variety of conditions.*"

Importantly, the adaptability of Vervet Monkeys is one of the factors that promote the interaction between humans and monkeys in an urban environment, making the monkey a nuisance to humans, in a built and structured environment. Fedigan and Fedigan (1998) agree that part of the Vervet Monkey's adaptability to marginal environments include areas of human settlement and activity. The status of the Vervet Monkey in a South African context will now be considered.

3.4. The Status of the Vervet Monkey

The official status of the Vervet Monkey in South Africa is at present very unclear and differs between provinces within the country. Most provinces have the Vervet Monkey listed as unprotected wild game or an indigenous wild animal, which allows a landowner to kill a Vervet Monkey without a permit (EKZNW, 2004). The status of the Vervet Monkey is uncertain in some provinces, but this is positive as the status is currently being reviewed and with time the Vervet Monkey might have formal protection in these areas. The Western Cape lists the Vervet as a protected wild animal. The Conservation of Agricultural Resources Act of 1983 classifies the Vervet Monkey as *vermin* which again affords landowners the right to kill this animal if found on their property, without having to obtain a permit to do so first (EKZNW, 2003). As a result, homeowners and farmers are allowed to kill a monkey if they feel that it is raiding crops or just being a nuisance. Internationally, the Vervet Monkey is listed in CITES Appendix II, which includes species "*not necessarily threatened with extinction, but in which trade must be controlled in order to avoid utilization incompatible with their survival*" (CITES Secretariat, 2005).

In 2004, Ezemvelo KwaZulu-Natal Wildlife, in a meeting to assess the status of the Vervet Monkey and to draft guidelines for its management in KwaZulu - Natal, acknowledged that the *vermin* status attached to Vervets was highly unsuitable. There was therefore a need for revision of the law for the following reason; "*Ezemvelo KZN Wildlife has a mandate to conserve biodiversity in KwaZulu-Natal. Since Vervet Monkeys are an indigenous species contributing to this biodiversity, and are a species that play a strong ecological role, there is a need to conserve natural populations*" (EKZNW, 2004: 1). EKZNW recognised the problems associated with habitat destruction and the associated effect on Vervet Monkeys. They also understood the dangers associated with humans, who were unable to cohabit with monkeys, considering monkeys a nuisance, and sometimes injuring or killing them in an attempt to rid monkeys from their property. They also acknowledged the lack of information on habitat destruction and the need for proper rehabilitation and management procedures regarding Vervets.

3.4.1 Draft Regulations: Vervet Monkey Management in KwaZulu-Natal

For these reasons Ezemvelo KZN Wildlife in collaboration with other interested and affected parties, formulated a set of draft objective and procedures for the management of Vervet Monkeys in the province (EKZNW, 2004). The objectives and management steps are listed under Appendix 3.2, but discussed here.

(a) Objectives

The objectives of the policy for the management of Vervet Monkeys in KwaZulu-Natal, were broad guidelines set out to handle rescued, confiscated, captive and problem Vervet Monkeys (see Appendix 3.2). The initial objective was to specify a uniform protocol for dealing with orphaned and captive monkeys and for the rehabilitation of injured monkeys. This objective was significant as the current reaction to orphaned, captive or injured monkeys is to deal with them on an *ad hoc* basis using local municipal practices which is not always in the best interest of the monkey. Standards are required for the handling of Vervet Monkeys in these scenarios.

The objectives also aimed to ensure the consistent and rigid application of legislation to prevent illegal and unethical practices (EKZNW, 2004). While it is essential that current legislation is enforced, this objective does not mention the review of legislation which governs urban wildlife, despite acknowledging in the document that the status of vermin is no longer justified. In addition, no mention is made of how laws will be enforced and what penalties exist to punish offenders. One of the main problems indicated by Thusi (pers. comm., 09/11/04) and Butler (pers. comm., 03/11/04) in prosecuting wildlife offenders is the lack of legislation and often offenders can only be charged under the law of *discharging a firearm in public*. Likewise, the objective to prevent trade of Vervet Monkeys and discourage their removal from natural habitats did not stipulate penalties or enforcement methods.

One of the objectives aimed at discouraging the perception of *problem animals* and promote ways of minimising conflict, but the objective does not stipulate if this will be done through education, legislation or other methods. If the vermin status of monkeys in not reviewed, farmers and landowners still have the right to shoot monkeys on their property, which does nothing for minimising conflict. Finally, the objectives aim to promote research to obtain factual information on which the management policies of Vervets can be based (EKZNW, 2004). In listing this objective the policy illustrates the lack of extensive knowledge on the problem between humans and monkeys and the limited information with which these guidelines were drafted. Moreover, there were no objectives aimed at the preservation of habitat or aims to research the effects of habitat on the interaction between humans and monkeys.

(b) Steps

The steps that EKZNW specified to undertake to meet the above objectives were listed as broad aims detailed under seven different sections. The guidelines related to knowledge and status of the Vervet Monkeys, conflict between humans and monkeys, orphaned and misplaced monkeys, captivity, rehabilitation, medical research and euthanasia. The guidelines were clearly informed by national and international legislation such as the KwaZulu-Natal Nature Conservation Management Act of 1997 and the principles set out by the International Conservation Union (IUCN). Those guidelines relating to the treatment of misplaced, captive and orphaned monkeys, as well as medical research and euthanasia followed protocol of IUCN guidelines and a discussion of these fall beyond the scope and expertise of this study. The guidelines dealing with monkeys in the specific context of problem animals, however, are of relevance to this dissertation and were found to be less clear and less informed.

To deal with monkeys in a problem animal context, the draft policy sought to increase knowledge and status of monkeys and to prevent problem animal issues. The policy aimed to do this by encouraging research into population dynamics of monkeys, their conservation status and an assessment of the threat to their survival.

Positive in these guidelines was the recognition of a need for information on population change monkeys under the section *increasing knowledge / status*. What the guidelines failed to specify was the need for monitoring on specific troop numbers. It is not sufficient to estimate population changes as one of the commonly held perceptions by residents in urban areas is that monkey numbers are increasing due to a decrease natural predators. Proper troop monitoring is therefore needed to verify or refute these complaints unequivocally. The guidelines were also positive in that they acknowledged the need for studies into the behaviour of monkeys when confronted with habitat destruction and contact with humans. Again, however, the preservation of open space to avoid these scenarios was not mentioned. Likewise, where research into translocation is mentioned, is should have been specified as a short – term solution and ultimately used to alleviate current problems, but is not an option for future developments. The section was titled *increasing knowledge / status* but did indicate any effort to change the vermin status of monkeys or to afford them the protection deserved by indigenous wildlife.

Under the section *prevention of problem animal issues* the policy aimed at preventing issues with problem animals by promoting education and awareness amongst the public, asset protection, increasing the capacity of staff members to deal with conflicts, promoting research into strategies to deal with conflict problems, taking action against offenders that harm these animals, and finally by consideration of trapping for the humane relocation of endangered troops. This section of the guidelines was very vague as it listed aims of preventing issues with problem animals but offered very little detail on how these aims should be achieved. While it encourages public awareness, methods of education and making the public aware of Vervet Monkey issues were not specified and neither was the organisation that will be responsible for this process. Also not specified was the content of education or awareness programmes. Would they just include information of asset protection or go further to provide information on monkey behaviour and advocate tolerance? The guidelines also aimed to create the capacity amongst interested and affected parties to resolve conflict with problem animals, but should have advocated partnership with EKZNW as they are mandated as custodians of wildlife and need to act as the overriding authority.

Strategies for dealing with monkey problems included friendly town planning, urban garden management and proposed artificial feeding methods. Again, not mentioned specifically is the preservation of open space as a strategy for dealing with the problem. *Friendly town planning* and *urban garden* management are weak concepts and not enough to maintain habitats for monkeys and thereby reduce conflict between them and humans. It is not specified if *artificial feeding* is just for areas with problems of high intensity or a long – term strategy, but the use of feeding stations as an option is surprising as during an interview with Subisiso Thusi of EKZNW (pers. comm., 09/11/04) he argued vehemently against feeding as it was against the policy of EKZNW to feed any wildlife.

Finally, the guidelines aimed to prevent or take action against destruction and inhumane disposal of monkeys. This guideline was entirely too weak and non – specific in dealing with a problem that is of great threat to Vervet Monkeys. Penalties for causing injury or fatality to monkeys were not specified and how enforcement will be achieved is unclear. Overall these guidelines were very short – term and did not aim to address the problem in its entirety but rather alleviate the immediate conflict.

Guidelines for the regulation of rehabilitation centres were also formulated. These guidelines aimed to develop procedures for rehabilitation that adhere to international standards and to register all rehabilitation centres, which will be supervised by a Rehabilitation Committee or Council. Guidelines for rehabilitation centres also included the prevention of the spread of disease through inappropriate rehabilitation, strict monitoring of the rehabilitation process, adherence to an approved management plan, adherence to a scientifically sound rehabilitation process, transparency and eradication of illegal practices and collaboration with a qualified veterinarian in development of guidelines. Centres failing to adhere to these rules ran the risk of being shut down. The need for more rehabilitation centres and standards for their operation is evident from the lack thereof in KwaZulu-Natal. These guidelines were therefore essential. The plan to develop main rehabilitation centres and satellite stations was positive in managing the large number of injured animals that are admitted in KwaZulu-Natal each day.

What was in need of stipulation, however, was the source of funding for these stations. Is it safe to assume that they will be managed and therefore fund by local government? If this is not the case then the system might prove to be unsustainable as currently CROW is in dire need of funding and relies heavily on public donations.

The guidelines drafted by EKZNW can be applauded for addressing the specifically the problem of Vervet Monkeys as opposed to indigenous fauna as a whole. A wide range of issues have been addressed ranging from research to rehabilitation. The failure of these regulations, however, lies in the absence of details and benchmarks for progress. Without more specific aims and outcomes, this draft paper runs the risk of being a paper exercise.

Questions such as who will undertake the required research and who will initiate public education are not specified. By what year does EKZNW envisage having rehabilitation centres and associated committees put in place? Do they foresee an improvement in the situation once sufficient research is done, so as to reduce the number of injured monkeys as opposed to just rehabilitating or euthanasing them. Rehabilitating injured monkeys indefinitely is not a solution. Ultimately injuries and abandonment should be decreased and there should be less conflict between humans and monkeys, but the aim of preserving habitat and thereby reducing unwanted interaction is not listed.

The guidelines also fail to take a firm and strict approach to monkey injuries and fatalities, specifics on enforcement and the penalties for such offences. Both the objectives and guidelines can be described as inadequate and too feeble to hope to achieve good wildlife governance. Legislation to modify the vermin status of monkeys is also not mentioned. Overall, these regulations are not backed by sufficient research and are not specific to the problem at hand. They also offer very short – term unsustainable solutions instead of offering a balance between short – term alleviation and long term resolutions.

3.5. Conclusion

This chapter has examined the eThekwini Environmental Management Services Plan, the characteristics of the Vervet Monkey that makes it so adaptable to human environments, and the status of and management plans for the Vervet Monkey in a South African context, narrowed to a provincial focal point. Plans for the management of Vervet Monkeys were assessed and found to be comprehensive in some aspects but having short-comings in targets and yardsticks for progress. The focus now turns to the study area used in this project. The following chapter will provide some background information on Durban, but focuses mainly on the former Westville Borough and the nature reserves contained within its boundaries.

CHAPTER FOUR
STUDY AREA

4.1. Introduction

Choosing a study area for any dissertation is an important selection to make as the area needs to fit certain criteria for the study. It is also necessary in choosing a study area, to justify a choice or eliminate other areas of similar characteristics. This chapter will provide a brief background to the choice of study area, the former Westville Borough, for this dissertation and then seek to put into this area into spatial context. A background to the City of Durban and then Westville is provided, concluding with a brief description of the open spaces within Westville.

4.2. Background

The area chosen for this study was done so on the basis of a few criteria. The first and most important of these was that the area had to have a history of complaints about monkeys. Logically, it would have been fruitless to choose an area that did not have a problem in the first place. Secondly, the area had to include new or recent developments as well as more established areas, so that it would be representative to perform a land-use change assessment thereby gauging the associated implications of this change on the monkey problem.

The area ideally had to include a well developed nature reserve and / or be a conservancy, which would allow questions on the influence of open space on perception of nature and monkeys, to be asked. In addition, the differences between areas close to a reserve could be compared with those further away from the reserve. Questions relating to corridors and open space systems would then also be applicable.

Westville, a suburb of Durban in KwaZulu – Natal met all of these criteria and was easily accessible from the University of KwaZulu-Natal. The one setback subsequently discovered, was the lack of land-use change data, including orthographic photographs prior to the year 1974.

4.3. The City of Durban

The city of Durban is located within the province of KwaZulu – Natal (KZN), which in turn is situated on the east coast of South Africa (see insert in Figure 4.1). Durban is a municipality located on the eastern seaboard of South Africa covering an area of 2 297 square kilometres. According to the Environmental Management Department, (2005: 15), "*the Constitution of the Republic of South Africa provides that in the Republic of South Africa, government consists of the national, provincial and local spheres. The Municipality is part of the local sphere of government and the Constitution states that this sphere is distinct form but independent upon and interrelated with, the other two spheres of government.*" In other words, the Durban Municipality is authorised to govern the city as it sees fit, but is in turn governed and supported by the other spheres of government and the Constitution.

While the city's total municipal area is only 1.4% of the total area of KZN, it is residence to just over a third of the population of KZN, contributes to 60% of its total economic activity and is home to Africa's busiest port (Environmental Management Branch, 2002). The climate of this coastal area is subtropical with mild winters averaging at a temperature of twenty degrees Celsius. Summer temperatures reach above thirty degrees Celsius with high humidity and high precipitation between October and April (eThekwini Municipality, 1998).

Durban was initially named *Thekwini* by the native Zulus, which means lagoon. It was renamed "*Rio De Natal*" by Vasco da Gama, a Portuguese explorer who "discovered" the province in 1497 (Wikipedia, 2005). British troops later established a trading port on land granted to them by King Shaka of the Zulu's and named it "*Port Natal.*" Large scale development occurred as an off shoot of the newly established port and the town was renamed, in honour of the then Cape Colony Governor Sir Benjamin d'Urban, to Durban (Wikipedia, 2005). Thousands of indentured labourers from India and other parts of Asia were shipped to Natal in the late 1800s. Durban thus held an exclusive eclectic mix of races and cultures.

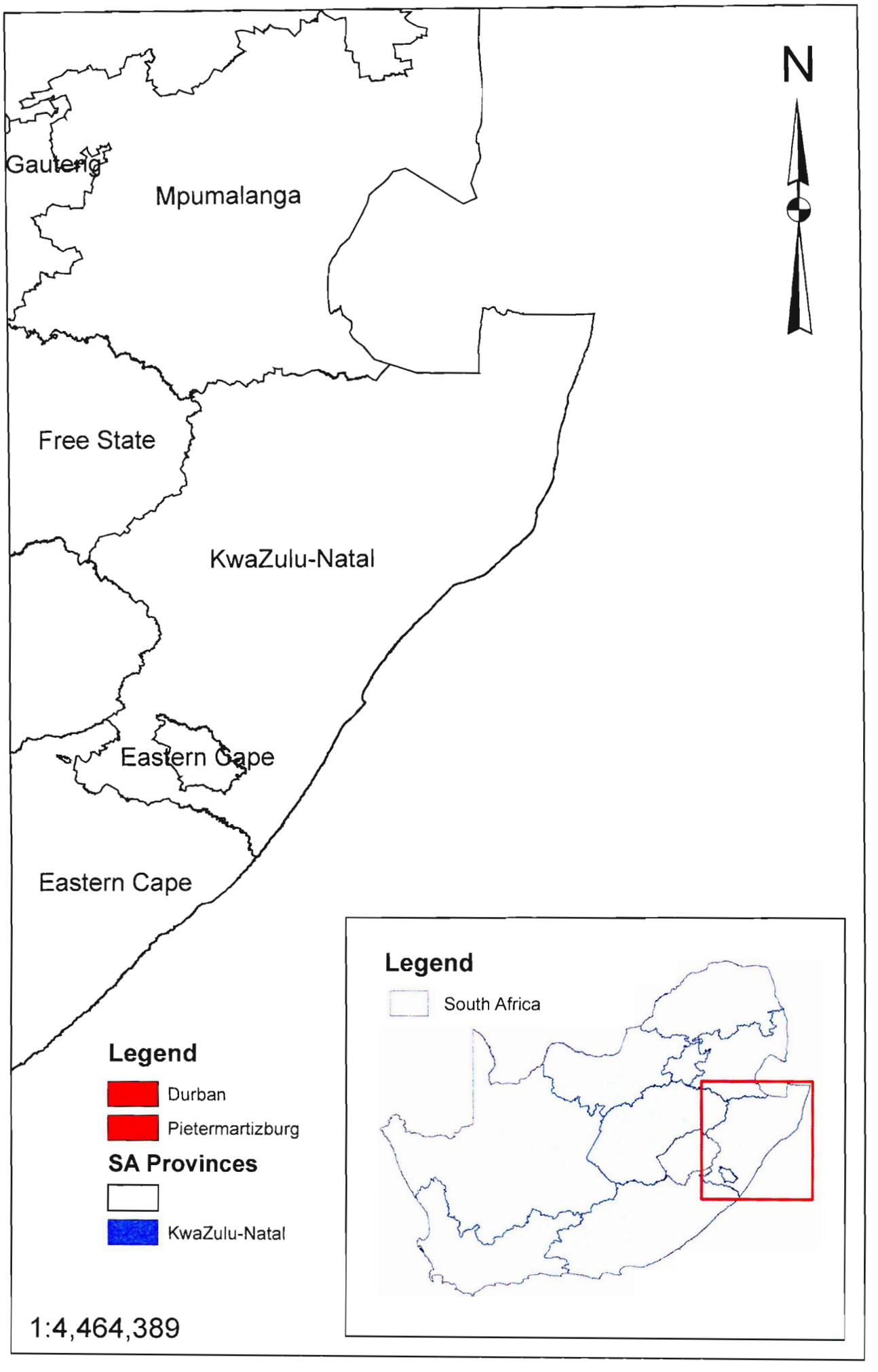

Figure 4.1: The City of Durban in KwaZulu - Natal, South Africa

Over the years Durban increased in size and its municipal boundaries were redefined. Post 1994 and South Africa's first democratic election, the boundaries were again delineated to include areas further inland to Cato Ridge and along the North and South coast to Tongaat and Illovo respectively, which then became known as the Durban Unicity (see insert on Figure 4.3). The actual central business district was named Durban Metropolitan while the city was renamed eThekwini Municipality (eThekwini Municipality, 1998).

4.4. Westville

The suburban area of Westville is situated approximately eleven kilometres inland from the Durban's Central Business District between Durban and Pinetown and runs along the National road (N3) from Durban to Pietermaritzburg (see Figure 4.2). It is situated within the Inner West City Council surrounded by Cowies Hill, Pinetown, New Germany, Claremont, Reservoir Hills and Sherwood (see Figure 4.3). It is classified as a residential town with several shopping centres, schools a well established civic centre, two major nature reserves and an internationally recognised university.

It is believed that the history of the town dates back to 1848 when thirty five Germans together with their families settled in the area with the intention of growing cotton (Westville Municipality (WM), 1993). Later the land was sold by public auction and general farming was commenced. The area was named Westville in honour of Martin West, the first Lieutenant Governor of Natal. It remained a farming area until the 1920s when the residential potential of the area was realised. In 1942, township status was conferred to Westville and in 1956 it received Borough status (WM, 1993). During this time Westville was governed by mayors elected by the local residents until the country's first democratic election in 1994. A demarcation process was initiated in this year and continued with the definition of local councils after the local elections in 1996 and finally the absorbing of all boroughs into the Durban Unicity by the year 2000 (Municipal Demarcation Board, 2004).

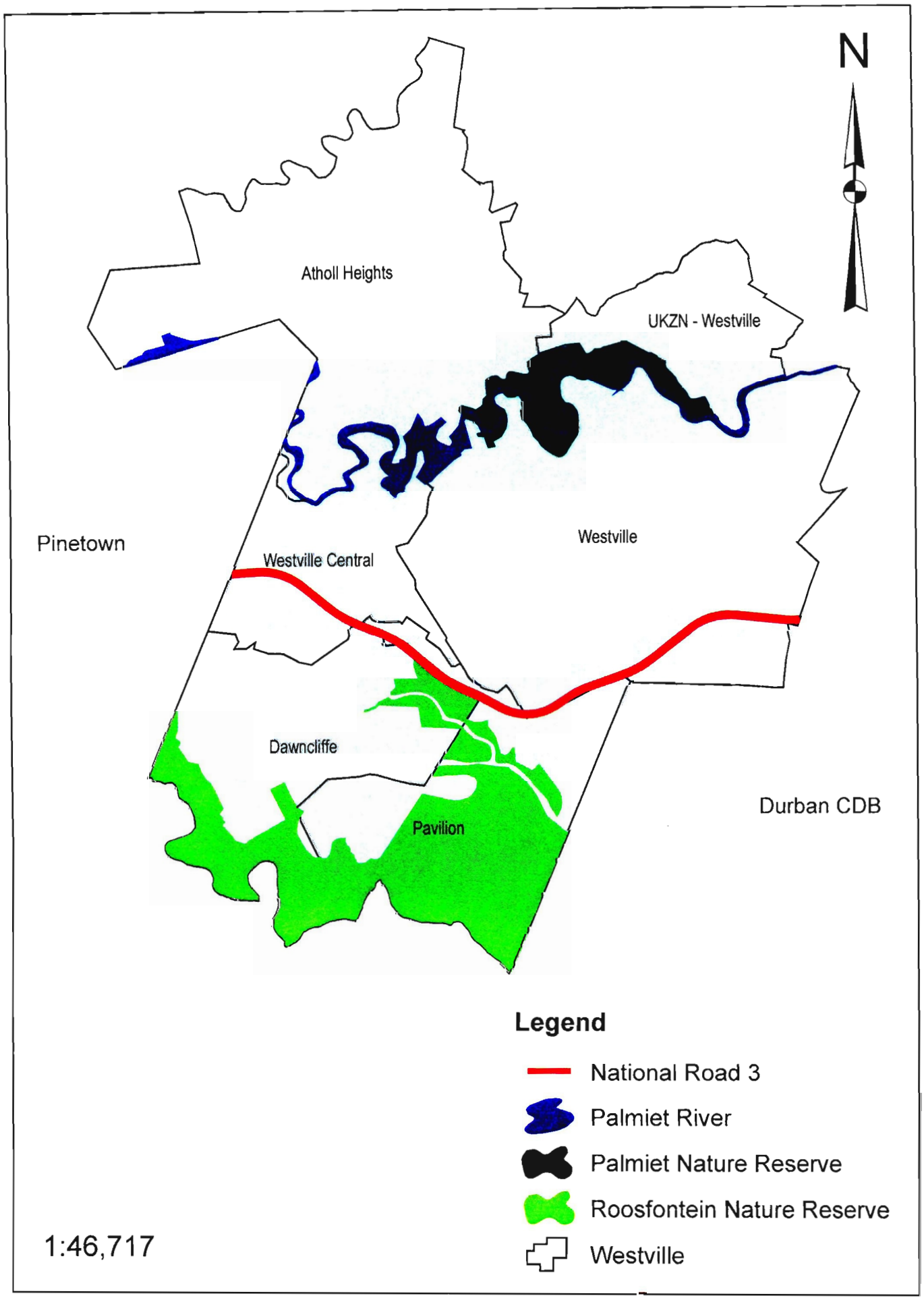

Figure 4.2: Suburb of Westville, Durban

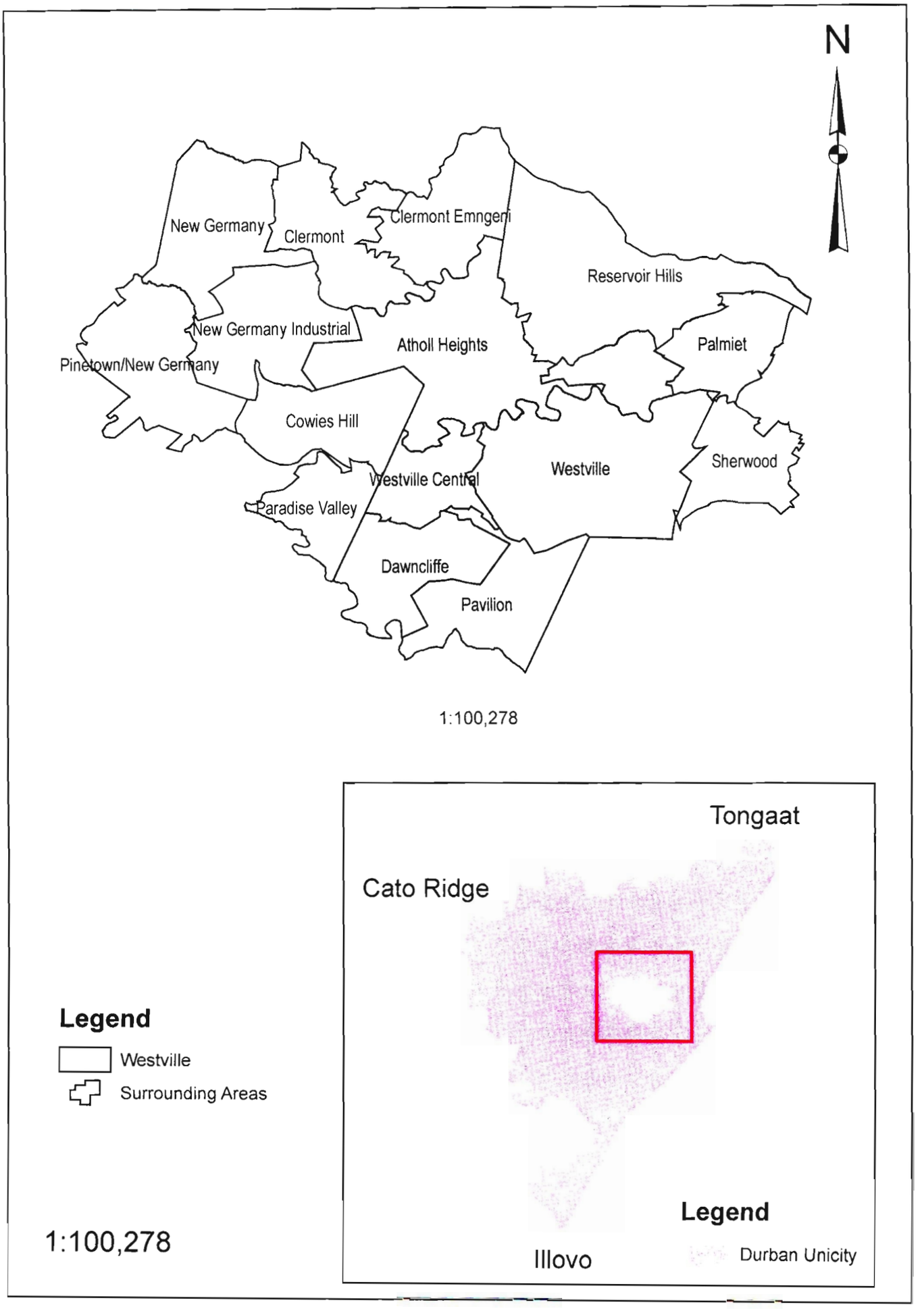

Figure 4.3: Westville and Surrounding Areas within the Durban Unicity

Westville is now a thriving residential area governed by the city of Durban and managed under the Inner West City Council (see Plate 4.1). Although fortunate to have a large open space provision, Westville is now subject to the same degree of development required to house Durban's growing population. The recent development of Lourie Park, a residential complex and additions to the Westville Mall and the Westville Pavilion are examples of this, juxtaposed with old historic developments.

Plate 4.1: Aerial View of Section of Westville (Schultz, 2005)

4.5. Palmiet and Roosfontein Nature Reserves

According to the Environmental Management Department (2005) South Africa is the third most biologically diverse country in the world. Durban contributes to this biodiversity rating as it houses 3 of the eight different biomes and seven broad vegetation types, 2000 different plant species, a significant number of estuaries, rivers and catchments and an extensive coastline in South Africa. In acknowledging the value of its diverse open space, the eThekwini Municipality has set aside a number of urban reserves, earmarked for conservation and forming part of the Unicity Environmental Unit Services Plan or D'MOSS (discussed in Chapter Three).

This open space system covers approximately 63 115 hectares of land and is valued at approximately 3.1 billion rand per annum in terms of environmental services. The Palmiet and Roosfontein Nature Reserves are municipal open spaces that form part of the open space system, both situated within the boundaries of Westville. Both reserves are managed by the eThekwini Municipality, Inner West Operational Entity.

Plate 4.2: The Palmiet Nature Reserve (The Westville Conservancy, 2005)

The Palmiet reserve was established 1972 as a municipal reserve situated in the center of Westville (see Plate 4.2). Cottrell (1978), in his evaluation of aerial photographs, found the reserve to be completely surrounded by urban development, save the area to the North which was occupied by the Palmiet River and several prominent cliffs. The reserve is currently classified as a riverine, coastal scarp forest and grassland, and covers a total area of ninety hectares (Boon & Croucamp, 2002). The reserve is home to approximately 150 bird species and 170 tree species. In addition, there are various mammals such as mongoose and dassies, reptiles like snakes and lizards and a variety of invertebrates living within the reserve.

The reserve is of high educational value, as in addition to being home to a diverse range of plant and animals species, it also contains middle aged stone artefacts linked to the late Stone Age, and stone and pottery associated with the early and late Iron Age (The Westville Conservancy, 2005). The reserve also has spectacular views, trails and picnic spots for visitors.

Roosfontein Nature Reserve is categorised by Boon & Croucamp (2002) as Bushclump Grassland Mosaic and Riverine covering an area of 150 hectares (see Plate 4.3). It lies to the south west of Westville and according to Cowgill & Davis (2003) a variety of grassland birds are resident along with mammals such as African Black Duck, Giant Kingfisher and Longtailed Wagtail. "*In summer, numerous migrant warblers such as Garden Warbler, European Sedge Warbler and European Marsh Warbler can be heard and sometimes seen in the thickets*" (Cowgill & Davis, 2003: ?). The reserve is open to visitors and has two hiking trails.

In addition to these nature reserves, Westville also has four proclaimed conservancies, Westville, Umvusi, Loerie Park and the University of KwaZulu – Natal Westville Campus. The Westville Conservancy is the longest running of the four and proclaims the mission of the conservancy is "*To maintain and restore the natural biodiversity and beauty of Westville for the long term benefit of all residents*" (The Westville Conservancy, 2005: ?).

Plate 4.3: The Roosfontein Nature Reserve (The Westville Conservancy, 2005)

4.6. Conclusion

The former Westville Borough was chosen as a study area based on its history of problems with Vervet Monkeys and its diverse surrounding, including old and new residential settlements, new semi commercial development and substantial open space in the form of reserves. This chapter reviewed the location of this residential suburb within the context of the city of Durban in the South African province of KwaZulu – Natal, followed by a brief description of the two nature reserves housed within Westville, the Palmiet and Roosfontein Nature reserves. The focus now turns to the actual data assimilation process, which is reviewed in the following methodology chapter.

CHAPTER FIVE
METHODOLOGY

5.1. Introduction

An issue as sensitive and complex as that of *problem animals* requires an extensive, multi-pronged and rigorous data collection process to ascertain the cause of conflict between humans and monkeys and to recommend a workable solution to the problem. The data collection procedure for this study was varied ranging from simple questionnaires administered to residents to in-depth interviews with key stakeholders. Land-use changes over a period of thirty years were assessed using 1:10 000 scaled orthographic photographs (orthophotos) of the Westville area. The process also included the scanning of the local newspaper *Highway Mail*, for articles and letters to the editor dealing with Vervet Monkeys in the Westville area. Finally, the scanning of records held by rehabilitation centres, veterinary clinics and other relevant organisations dealing with injured animals was also performed. This chapter aims to explain the theory behind various data collection methods and their suitability to this particular study. The actual process of each method will also be discussed along with the strengths and weaknesses.

5.2. Background

5.2.1. Philosophical Approach

Kitchin and Tate, (2000: 5) explain that "*even if not explicitly articulated all research is guided by a set of philosophical beliefs These beliefs influence or motivate the selection of topics for research, the selection of methods for research, and the manner in which completed projects are subjected to evaluation.*" Philosophy plays an important role in the research process and often dictates the methods of data collection and analysis employed and therefore the recommendations and overall outcome of a project or dissertation. In addition a particular philosophy also shapes a persons thinking, allows a greater understanding of research carried out by others and clarifies where to base research (Kitchin & Tate, 2000).

There are numerous approaches to knowledge used in research and in particular, geographical research. These approaches differ in their underlying principles. As described by Kitichin & Tate (2000), research is conducted according to the ideology, epistemology, ontology and methodology dictated by a philosophy or school of thought. Ideology is the underlying motivation, whether political or social, for researching. Epistemology is the way in which we can arrive at the knowledge we are seeking and ontology is the set of assumptions we use to do so. Methodology is the process we use to collect data or investigate a trend within the overriding laws of epistemology and ontology. Taking these factors into consideration, all research philosophies differ from the next in some way.

One such philosophy is *Positivism*, a modernist philosophy based on a specific set of assumptions and a methodology designed to eliminate speculation and metaphysics. By using an objective and stringent data collection process to determine social behaviour, positivism claims the ability to explain any phenomenon using a cause – effect relationship. The epistemological approach of positivism would be to collect data in an objective and systematic way using direct observation. The ontology is that only phenomena that can be directly observed are valid and all phenomena can be explained by a cause and effect relationship. The belief is that everything that occurs in nature or all human behaviour is due to a particular reason or "cause." This "cause" can be identified (Johnstone 1983: 27). The methodology follows a hypothetic-deductive approach where a hypothesis is formulated and objective data collected to prove or disprove the hypothesis. From this laws and theories are developed.

While positivism is considered inadequate for research by some (Harvey, 1973; Kitichin & Tate, 2000), as it fails to take into account underlying social, political and economic factors, it is still widely applicable in many areas of natural science (Cloke *et al.*, 2004). For example, the questionnaires and interviews of this dissertation asked closed and open – ended questions, which were then analysed quantitatively (discussed later). Both asked factual questions such as the number of monkeys that visit a property and open – ended questions like the role of culture or religion in the monkey problem, which was more qualitative than quantitative.

For the purpose of this project, a positivist method was employed for the collection of data but applied to both natural and social science aspects of this research. The positivist method of research was therefore adapted to address a range of issues which were all analysed in a similar style.

5.2.2. Quantitative and Qualitative Research

A common distinction is made between the form in which data is collected, namely quantitative and qualitative methods. The type of data collected is dependent on the methodology used in the process which ultimately guides the analysis process and dictates the outcome of the project. A quantitative data collection method is described by Rothwell (1999: 54) as "*methodology based on the measurement of phenomena and the expression of knowledge in the form of numerical data.*" In short, quantitative data is all data expressed in numeric or statistical form, or converted to quantities for easy analysis. Some researchers favour quantitative data as they consider it objective and conducive to comparisons (Cloke *et al.*, 2004). Others disagree (Kitchin & Tate, 2001), however, arguing that no research is completely objective and that statistical data ignores underlying social and political issues.

Qualitative data is defined by Cloke *et al.* (2004: 17) as "*data that reveal qualities of certain phenomena, events and aspects of the world under study, chiefly through the medium of verbal descriptions which try and convey in words what are the characteristics of that data.*" In short, qualitative data is data collected in text or descriptive form. Again, there are conflicting views on the value of this type of data. Some believe that it has low applicability in the social sciences due to its subjective nature (Kitichin & Tate, 2000; Robinson, 1998), while others believe that it is the only accurate method of representing the world (Johnston, 1983).

Both types of data have applicability in different settings in research and have both been used for the purpose of this project. The questionnaire and interviews requested both quantitative and qualitative responses, the former important for wide scale community perceptions and the latter in an attempt to unpack the causes of and influences on the problem.

5.3. Data Collection

Kitchen and Tate (2000: 212) assert that two of the most crucial questions a researcher can ask when undertaking a project are "*how am I going to produce data*" and "*how am I going to approach data production.*" There are different ways of producing data and a discussion of primary and secondary data generation follows.

5.3.1. Primary Data

Primary data is essentially data that is collected by the researcher often solely for the purpose of a particular project. Referred to by Cloke *et al.* (2004) as self constructed data, primary data is that which is collected through active engagement on the part of the researcher to produce first-hand information. There are various methods that allow the collection of primary data, i.e. questionnaires, interviews, fieldwork, surveys and ethnography. Primary data collection is important for research where no other data exists on a particular subject, or no relevant data exists from the information collected to date. If completed properly it allows for concise and rigorous data generation that will in turn be a rich source of information to future researchers.

a) Questionnaire Surveys

One of the primary data collection methods used for this project was the administration of questionnaire surveys. Cloke *et al.* (2004: 130) describe a questionnaire as "*an instrument of data construction comprising of a carefully structured and ordered set of questions designed to obtain the needed information without either ambiguity or bias.*" A questionnaire is a data collection method that is widely used in all forms of research and can often be more appropriate than other data collection methods for various reasons. Questionnaires can be administered in various ways, including via post, electronic mail or over the telephone, but is often done personally. Questionnaires offer a standardised method of generating quantitative data, which can then be converted to statistical data (Kitchin & Tate, 2000).

According to Robinson (1998), questionnaires can provide both quantitative and qualitative information. The former can be achieved through a standardised questionnaire with a rigorous sampling format attaining generalised findings. The latter can be achieved using a semi-structured questionnaire with the option of explanations when answering. The use of open ended and closed questions are important here. A closed question is one that affords the respondent a choice of answers (e.g. multiple choices). An open-ended question allows the respondent to offer a detailed explanation which is then recorded verbatim.

When assessing wide-scale community perceptions, with the need for basic understanding and comparison, questionnaires are most appropriate. Cloke *et al.* (2004) offer the example of a study of homelessness in the United Kingdom. Questionnaires were rendered most appropriate for the assessment of widespread comparative information on the scale of the problem and perceived significance of homelessness. Similarly, understanding the scale and perceived significance of the problem of Vervet Monkeys from a large community perspective, the approach of administration of questionnaires for a survey was deemed appropriate for providing standardised and comparative statistical data. Subsequently, generalisations about the nature of the monkey problem in Westville could be offered, as the population would be statistically representative. The questionnaire was designed for residents, experiencing the problem first-hand, but not often in possession of any technical expertise regarding the subject. In addition, cross tabulations or correlations are done easily with uniform information gathered from a questionnaire. The method is also less time consuming for both the researcher and interviewee.

The format used for the questionnaire administered to Westville residents followed a semi-structured format, using a combination of open-ended and closed questions to generate both qualitative and quantitative data. The sampling frame were the residents of Westville using a non – probability convenience sample. Questionnaires were e-mailed to all Westville residents on the e-mail database of the Westville Conservancy and questionnaires were also handed out to residents of Westville by the Westville Conservancy and the Palmiet Nature Reserve Management Committee that visited either of these two organisations.

The respondents were not necessarily members of either of these two groups as the Westville conservancy holds a database of all Westville residents in general. The process was initiated in October 2004 and the last questionnaire was received in April 2005. In total, thirty questionnaires were returned either by post or e-mail.

The questionnaire (see Appendix 5.1) was divided into four main sections. The first two dealt with two key aspects of the topic, the third section with demographics and the final section required a site (garden) survey (see Appendix 5.1.). The name of the respondent and the date was at the outset requested, but the request for their name was optional to afford the respondent anonymity. Section one was designed to establish the exact nature of the monkey problem and verify that experiences of the resident were real as opposed to hearsay. The section included both open ended and closed questions hoping to asses the resident's exact experiences coupled with their perceptions of the problem. The section begins with an assessment of the nature of the problem (i.e. nature of complaints) and the perceived threat of monkeys to humans. The closed questions that followed asked for quantitative information such as the frequency of monkey visits and the number of young they carry. These questions required observation and numeric data as accurate as possible. This section of the questionnaire was critical in its role of assessing the actual character of the problem without the use of field surveys. Open questions were then used to gauge perceived changes in land – use.

Section two dealt with the public perception on the causes and influences of the problem. This section contained seven open ended questions that assessed opinions on the link between tolerance of humans towards monkeys and external factors, such as religion, education, and the influence of living within a conservancy. Respondents were also asked if they would be willing to modify aspects of their garden if it would assist in alleviating the problem. Section three was a short demographic section that asked personal questions that were thought to have a possible link with or influence on attitude and perception towards monkeys. Respondents were asked their age, gender (which was optional), level of education and if they belong to any environmental group or organisation.

The question requiring the interviewee's gender was optional so gender sensitive people could refrain from answering this question. Their address was also requested to possibly place a location on certain monkey hot-spots or areas of high complaint.

Finally, the forth section required a simple site survey of their garden and requested information on the size of the garden, the percent of indigenous and alien vegetation and the number of fruit trees (if any) that were present in their yard. This survey was carried out to ascertain if there was any link between the type of garden and the occurrence of monkey problems.

The questionnaire elicited both quantitative and qualitative responses and was useful in obtaining data about the nature of the monkey problem as well as the resident's perception of the problem.

b) Interviews

Interviewing is a method of data collection involving personal communication with the interviewee or interviewees. As in a survey, an interview can be administered in different ways such as via the telephonic or face to face, and can range from semi-structured to unstructured but differ from a survey in their intent and purpose. While a survey is less personal and often requests broad and fairly closed responses, in-depth interviews are more personal, often requesting in – depth accounts from interviewees. Cloke *et al.* (2004: 149) describe such in-depth interviews as "*conversations with a purpose*" with the intention to "*give an authentic insight into people's experiences.*" Such an interview can stimulate a lengthy and rich conversation leading to an invaluable personal account.

Again, using the example of homelessness in the UK from Cloke *et al.* (2004) if a person were to seek to understand the underlying causes of homelessness or what it feels like to be homeless, an intensive interview would be a more appropriate data collection tool than a survey questionnaire. Similarly, the assessment of the more technical aspects of the monkey problem in Westville and for understanding underlying triggers, interviews was considered apt.

As Cloke *et al.* (2004: 150) explain about the nature of an interview "*there is an emphasis on explaining processes, changing conditions, organisation, circumstances and the construction, negotiation and reconstruction of meanings and identities.*"

Another distinguishing characteristic of interviews is the sample population. As mentioned previously, questionnaires by nature will aggregate individuals into broad categories and specifics of responses will be lost. The sample used in interviews generally are principal stakeholders that have valuable knowledge of or insight into the problem as well as influence in decision making, whether they are part of a governmental department, NGO or private company. Stakeholders were thus chosen on the basis of their knowledge and experience with the problem and for giving a voice to individuals or groups that adopt different positions in the *Vervet Monkey discourse*.

Generally, in this study, the survey was reserved for residents of the Westville Borough, while interviews were administered to key stakeholders involved in the management and/or control of wildlife or monkeys in particular. The sampling method used for the interview process was purposive non – probability. The initial sample of interviewees was gained from the identification of major role players involved in the governance and rehabilitation of indigenous fauna. Ezemvelo KwaZulu-Natal Wildlife (EKZNW), the Centre for Rehabilitation of Wildlife (CROW) and Jean Senogles were initially approached. Jean Senogles is the chairperson of the Palmiet Nature Reserve Management Committee and recognised authority on Vervet Monkeys in the Westville area. Subsequently, a snowball effect was used, whereby interviewees were asked to identify or suggest other potential interviewees based on their understanding of and influence in decision-making. In total, ten stakeholder groups or individuals were identified and in the case of groups, appropriate representatives in each association were contacted (see Appendix 5.2). Overall, the sample was small and not appropriate for general conclusions on the nature of the monkey problem. It was, however, useful in gaining a deeper understanding of the triggers and influences of the problem and the more technical aspects of these influences.

It was hoped that social analysis would offer a rich set of qualitative data that would aid in formulating appropriate recommendations to inform future decision making and management. Interviews used in this project were semi-structured meaning that pre-constructed questions were used as a guide for questioning but interviewees were allowed to elaborate at length over each question and only when they digressed fully off the topic were they steered back to the question at hand.

The interview questions deal broadly with firstly a general account of the monkey problem as a whole (see Appendix 5.3). Interviewees were asked about their opinion on the nature of the problem and whether or not the monkeys were a real threat to humans and vice versa. This could be answered with knowledge of the problem in its entirety and not just relating to Westville. The specific questions followed where respondents were questioned about the cause of the problem in Westville in particular and if they problem was seasonal or consistent.

They were also required to assess if the problem had increased, decreased or remained the same over the last two to three decades, specific to the Westville area. Land-use changes in Westville was also explored and interviewees were asked for their account of the change in the land-use structure in Westville over the last few decades. Respondents were requested to elaborate on the effect, if any, this change in land-use had had on the monkey problem. In addition, respondents were also asked who, in their opinion, was responsible for dealing with the problem and these animals. Somewhat controversial questions were also included as interviewees were asked their view on the feeding stations, the efficiency or effectiveness of Environmental Impact Assessments (EIA) and the role of corridors in an urban environment. Interviewees were asked to elaborate on their answers. For example, if a respondent answered "they are not good" when asked what their opinion was on feeding stations, they were asked to explain why and what actual affect the feeding stations had to warrant this response. If they answered "no" when asked if EIAs played any role in foreseeing and mitigating the problem, they were asked to explain why and if the short-coming was in the administration of the EIA or the actual legislation.

Interviewees were then questioned about their perceptions on the role of education and awareness, religion and spirituality and the effect of living near an open space. These three broad questions dealt with the possible influences on the perception of nature held by humans and a potential catalyst in influencing people's opinions in the future.

The interview came to close with the question of a possible solution to the conflict between humans and monkeys, keeping in mind the rate of unchecked development and urban sprawl. Again respondent had to elaborate on why they felt a particular method would work or why others would not. Respondents were also asked if they had additional comments and if not the interview was ended. Interviews lasted between forty five minutes and ninety minutes. Although interviewees were difficult to contact and their availability limited, the interviews were useful in-depth insights gained from vibrant conversations with mostly highly enthusiastic interviewees.

5.3.2. Secondary Data

Secondary data or pre-constructed data is data that has been previously collected or accumulated by a researcher or other interested groups. Sources of secondary data can be divided into official sources and non-official sources (Cloke, *et al.*, 2004). Official sources include state documents like Census data. Non-official data includes media coverage, personal documents, research reports and maps. These sources are important when the information they provide is difficult to collect (e.g. census data) and for background information and pilot studies. Kitchen and Tate (2000) further divide secondary data into primary, secondary and tertiary sources where, primary sources are first hand accounts from people who witnessed a particular event, secondary sources are recorded after the event by second parties and tertiary sources are locator documents for other information (e.g. bibliography). All secondary data, in whatever form have applicability in different scenarios depending in the type of research being undertaken. They are often cheap, easily accessible and because they contain factual data, they can be used to compare events and processes across time.

Caution should be exercised, however, when using pre-constructed data. The objective, date and method of data collection of a particular source should be known as well as the format of some data (i.e. maps). Having said that, it is important to note that secondary data, in particular non-official data, opens up social world which are otherwise inaccessible, and can provide a more vibrant and colourful account of events than primary or official sources (Cloke *et* al., 2004). Secondary data in the form of literature reviews, newspaper articles and letters, and orthographic photography were used to form the complete and extensive data set.

a) Orthographic Photography

A map is a tool used to represent spatial information, usually in relation to the surface of the earth (Kitchin & Tate, 2000). Maps can provide its reader with a variety of valuable information that is either represented directly or concealed, and can be accessed easily depending on the researcher's analytical capabilities. An important source of geographical information are images obtained from the process of photogrammetry which is defined by Wolf (1974: 1) as "*the art, science and technology of obtaining reliable information about physical objects and the environment through processes of recording, measuring and interpreting photographic images and patterns of recorded radiant electromagnetic energy.*" An orthographic photograph is an aerial photo where "*the distortion from the camera system terrain are removed from the imagery, resulting in an image that exhibits the characteristics of a map*" (Digital Past, 2002: no page). Using aerial and orthophotos and the process of repeat photography, changes in landscape over time can be easily visualised. The process of repeat photography is defined by Rossouw (1997: 72) as "*the practice of finding the site of a pervious photograph, reoccupying the original camera position, and making a photograph of the same scene.*"

According to Rossouw (1997) the value of photographs, as a precise record of the physical and biological world, became clear just after its invention in 1839.

Specifically for the assessment of land-use change over time, photographs can be taken of the same place at different times and in this way provide an invaluable record of change for that particular area. As Allen *et al.* (1998: no page) explain in their assessment of landscape changes in south west United States, "*differences between then and now provide a basis for identifying and even quantifying changes, while the new photograph establishes a benchmark for future evaluation.*"

Rossouw (1997: 68) adds that a pair of matched repeat photographs will link a past moment with intervening unseen events to the recent image, providing and illustration of temporal variations of an area. Therefore the dominant themes of repeat photography are:

- "*Quantifying the rate, nature and direction of change in the observed features*
- *Evaluating the underlying causes of the perceived changes, and*
- *Establishing new photographic records for future researchers to study*"

Evidence of vegetation change comes primarily from two sources and these are repeat or matched photography and historic descriptions of landscape. Work by Newton & Knight (2005) to assess local agricultural transformations of west coast Renosterveld (an endangered South African vegetation type) illustrated the use of aerial photography in measuring land-use change or transformation. Using scanned images from as early as the 1930s, analysis was done by rectifying images and then digitising them into different vegetation classes. Ultimately, a set of time-change images was produced for four different sites to monitor changes in the extent of the natural vegetation that had occurred between successive images. In their discussion on the technical aspects of their methodology, Newton and Knight (2005: 20) concluded that the use of aerial photography for the specified task was useful as the photographs showed "*no significant errors, relative to the original, with respect to location or resolution.*" They did agree, however, that the use of orthorectified imagery would have been more suitable had there been available for the required time frame.

Similarly, Rossouw (1997) in his study on the temporal and spatial landscape changes of the northern slopes of Table Mountain, made use of multi-temporal aerial photography to assess changes in vegetation and erosion. Four broad vegetation classes were chosen for interpretation of vegetation and erosion and percentage changes over time were calculated to determine the rate of change over time.

In addition, Roussouw (1997) cites the following studies that exhibit successful use of aerial photography for land-use change and vegetation mapping; Bahre & Shelton (1993) for their use of sequential aerial photography to cast doubt on the hypothesis that vegetation change in south eastern Arizona was mainly due to climatic change, and Watson (1995) for the use of sequential aerial photography in the assessment of vegetation changes in part of the Hluhluwe – Umfolozi Park in KwaZulu – Natal.

On the basis of the suitability of aerial and orthographic photographs to assess land-use and vegetation transformations, orthographic photographs were used for assessment of land-use change for this study of the former Westville Borough. Three sets of orthographic photographs were obtained, from the years 1974, 1985 and 2000. The set from 2000 was a digital copy so input into GIS was relatively simple. The sets from 1974 and 1985 were hard copies and had to be scanned for on-screen digitising. The sampling of these maps was purposeful based on availability. The 1974 set was the earliest available orthophoto and the 2000 was the most recent. The 1985 set was the only set obtainable from the intervening decades. The maps were all scaled at 1:10 000 and followed a Gauss Conform Projection, Central Meridian 31° East.

The 2000 map was a large digital set of the Durban Metropolitan area. Using the co-ordinates of the Westville boundaries from the 1974 map, the 2000 map was cropped and the new image showing just the Westville area and portions of the surrounding areas was loaded into GIS. The projection was specified making it ready for digitising. The maps from 1974 and 1985 were scanned using Microsoft Photo Editor and saved to disk. Using the same computer program, maps were cropped.

Four control points with co-ordinates specified from the original maps were entered into Microsoft Excel and then exported as a text (.txt) file to an attribute table on GIS. The control points were loaded as a layer into GIS and their projection specified. The projection used was Gauss Conform Projection, Central Meridian 31° East. Once this was complete, the control points were converted to a GIS shapefile. The photos were then loaded into GIS and their projection specified. The control points were then dragged to their appropriate positions on the scanned images, rectifying the images and making them suitable for digitising. Four shapefiles were created for digitising using ArcCatalog. These were broad categories designed to assess vegetation changes specifically. The categories created were forested and woody areas, natural grassland, recreational areas and water bodies. Only areas that fell within one of these categories were digitised and the rest were left as default areas. Digitising was relatively simple with the 2000 map but more difficult with the 1974 and 1985 maps as the quality of the images were poor after scanning. Maps had to consulted regularly as a reference for certain areas.

Once digitising for all three sets was complete, the total area (m^2) of each polygon in each category was calculated. A new field was added to the three attribute tables and the function "calculate value" was used to access the "field calculator" and compute the area values using a formula provided by the GIS programme (see Appendix 5.4.). Once this was done the "statistics" function was used to view the sum of the areas of all the polygons in the individual categories. In addition, the frequency distribution of each land-use was also viewed to assess the size distribution of the pockets of open space remaining in Westville.

While the process was somewhat interpretive due to the poor quality of the scanned images, constant referral to the original maps made the results more accurate. It was useful in providing a basic and overall picture of the trends in land-use and vegetation transformation in the Westville area, using accurate and truthful data sources.

b) Literature Review

According to Cloke *et al.* (2004) "*recent years have seen an explosion in semi-autonomous research centres, sometimes linked to universities but more usually funded through charitable or private sources.*"
A review of past research or literature on a particular subject forms the basis for one of the most important sources of data that frames and influences a persons own research. Literature including books, journal articles and unpublished dissertations, is considered un-official, but forms a large part of a theoretical framework, for explaining research results and indeed for the project in its entirety. So, although considered a non-official data source, the review of literature is significant for the basis and background to the project.

The data collection for the literature review chapter of the dissertation was the most lengthy and extensive component. Collection of various articles (from printed and electronic journals), books and other printed sources of information were collected from the commencement of the project and continued throughout the write-up as new or additional data was constantly required on various subjects for the project. The data collection in this process forms the major part of the literature review chapter and the subsequent background chapter. Literature was also used for the introduction, background and methodology sections. The literature review section also informs the discussion, as primary data is compared to the literature reviewed before recommendations are provided.

c) Newspaper Articles and Letters to the Editor

Although often considered sensational or unreliable, the media produces a whole range of material based on facts, that can offer valuable information to events and phenomena that occur in society. In addition to documenting factual events, the perception of the general public to occurrences or a particular subject can be gauged. Cloke *et al.* (2004) cites the example of Cresswell (2001) who used newspaper reports, magazine articles and documentary photographs to examine the perception of and treatment of tramps by the media, found that it played a critical role in the construction of knowledge on the subject.

In addition, Gullo *et al.* (1998) in their text "The Cougars Tale," illustrated the major role that the media can play in the social construction of nature, particularly in the minds of residents.

On the Orange County *Cougar Debate*, Gullo *et al.* explain that (1998: 149) the Times, was "*a vital source of understanding about the dynamic renegotiation of nature/society relations serving to purvey social constructions of animals and thereby shaping public attitudes and policy alike. Like other media texts, Times coverage also reflects public attitudes through distribution of the knowledge, attitudes and positions of public actors such as politicians and scientific experts, and the views of a mix of the general public.*"

Specifically, for an assessment of changing public perception on monkeys, the articles and letters to the editor in local newspapers are a means of gaining insight into popular opinion or views at a time that is otherwise forgotten and therefore unobtainable. It is improbable that residents can provide a detailed, accurate and objective account of these changing perceptions, unless well documented or diarised. As Cloke *et al.* (2004: 71) put it "*newspaper articles and stories form a major part of our lives, alongside audio and visual news media. They tell us what is going on in the world; and they tell us about important changes taking place in different cities, regions and nations; and they explain to us why such changes are occurring and their likely implications.*"

Newspaper articles and letters to the editor were scanned from the local Inner West municipality newspaper called "The Highway Mail." This newspaper is printed fortnightly and contains articles pertaining to development and activities in the Inner West area of Durban. Archives of the Highway Mail newspaper were accessed from the Pinetown Library Advisory Desk. Records from 1960 to 2004 were scanned for articles dealing with Vervet Monkeys in a *problem animal* context, and for letters from the public on the same subject, in the Westville area. Applicable articles or letters were photocopied and the date, page number and volume number (if available) recorded. Other relevant information that could be gathered from the script was also recorded. In total, twenty two articles and twenty two letters deemed applicable and included in the sample.

The process was quite tedious and lengthy, as it took more than one hour to scan all issues printed in a year, and therefore a decade took more than two full days to complete. Nevertheless, the process offered a rich account of the residents changing perceptions of Vervet Monkeys over four or so decades.
Some letters provided first hand descriptions of human contact with Vervets and the detailed explanations of their behaviour, which proved useful.

d) Records from CROW

Commercial and non-commercial organisations or institutions also provide useful internal material in the form of records, memos, meeting minutes, reports and messages. While these sources are not based on research, they are valuable as they are factual records of the operations of a company or organisation. Access to this type of information can be limited but if a researcher is lucky enough to gain access, the data could be invaluable. Although not recorded specifically for public utilisation, required data can be sifted out allowing the user valuable access to statistics and trends that can only be obtained from organisations that deal with these specific records. For example, Cloke *et al.*, (2004) cites the example of a study on the changing geography of the European Automobile Industry which was based on reports from car manufacturers.

Records of injuries of wildlife in Durban are held by the only official rehabilitation centre in the area, the Centre for Rehabilitation of Wildlife (CROW). People who bring in injured animals to the centre are requested to fill in a detailed form on the nature of the injury and where the injured animal was found (see Appendix 5.5). The doctor then fills in a description of treatment and exact injury on the same form. A total of twelve admission forms related to Vervet Monkey injuries in Westville and were included in the sample. By examining these records of injuries, confining the search to the Westville area, information on the nature of their injury, doctor's diagnosis, location and a profile of the injured monkey (i.e. gender, age etc) were easily gained. From this information, useful insight into the characteristics of the injured monkeys and the nature of injuries were be acquired.

Being the only centre in KwaZulu-Natal authorised to rehabilitate injured wildlife, the CROW records were not only a beneficial source of information, but significant due to the fact that they are only records of this nature that exist in the province.

In addition to CROW, other organisations were approached for access to injured animal records and records of complaints on Vervet Monkeys. The Maryvale, Wansbeck, Blair Atholl and Westville Veterinary Clinics were approached and it was found all injured wildlife brought to these clinics were immediately sent to CROW as they are the only authorised wildlife rehabilitation centre. The veterinary surgeons only treated emergency patients with quick-fix or shock medication until the animal could be dealt with by CROW. No records of injured animals were kept as they were never admitted to the animal clinic. Westville Police Services and police services from surrounding areas affirmed that they had been called out on various occasions to retrieve injured monkeys or to deal with irate residents, but kept no records of complaints or injuries. Injured animals were not treated at all by the Police Services but instead taken directly to CROW. The *Kloof and Highway* and *Durban and Coastal* branches of the Society for the Prevention of Cruelty to Animals (SPCA) said that they only retrieved injured animals and again sent them to CROW.

While records of injuries of and complains on Vervet Monkeys were difficult to come by, the records held by CROW were valuable in establishing a general profile of the monkeys injured most often and by what means, information that would have otherwise been difficult to ascertain.

5.4. Strengths and Weaknesses

A strength in the methodology of this research project lay in the varied data sets produced by a variety of data collection methods which were thought to be most appropriate for obtaining each different set of required information. Various problems were encountered, however, due to lack of information or proper data sources.

Orthophotos were required for the Westville area from the 1940s to assess the impact of major highway development on land-use changes an in turn habitat destruction and the monkey problem. Westville, however, did not fall within the boundaries of Durban Municipality prior to the early 1990s and orthographic photographs for this area prior to 1974 did not exist. The time frame of land-use change assessment had to therefore be narrowed.

Using the available sets from 1974 and 1985 were difficult as they were hard copies and had to be scanned, causing deterioration in the images and making them harder to interpret. Re-zoning records were untraceable and land-use changes therefore had to be assessed using orthophotos from 1974 onwards, and the more subjective method of resident's personal accounts determined during interviews.

5.5. Conclusion

Using the framework of positivism, primary data was collected by the administration of questionnaires and interviews. Secondary data on land-use change was collected using orthophoto's and records were obtained from the Highway Mail, Inner West City Council and CROW. Each data collection method was decided upon taking into account the sample population and the type of data required. Questionnaires gave a general picture of Westville resident's perceptions and interviews offered a more in-depth view of the problem from important stakeholders, while records and maps were used to collect more technical data on the problem. The collection process was authentic. The following section will present the analysed results of the data collected in this process.

CHAPTER SIX
RESULTS

6.1. Introduction

Having assimilated various sets of data through collection methods described in the previous chapter, analysis was done according to the type of data and the information required from it. The results of the questionnaires and interviews are presented first, followed by the land-use change assessment from orthographic photographs. The analysis of the records from CROW and articles and letters from the *Highway Mail* follow. Finally, results of the assessment of the relationship between the perceived or actual monkeys problem correlated with demographic and site survey data, is presented in the last section of this chapter.

6.2. Questionnaire Survey

The results from the questionnaire survey were coded and converted into percentages for easy visualisation and comparison. Questionnaires were divided into four sections, as described the pervious chapter, and analysed in this format as well. Results of the questionnaires are presented in this order. Having completed a number of questionnaires to form a representative sample and provide a consensus of residents opinions, many of the results are presented in the form of graphs or tables to easily illustrate significant or outstanding findings.

Section one of the questionnaire explored the nature of the monkey problem and initially enquired from the residents what their specific complaints about Vervet Monkeys in a residential area are. Results showed that the problem was more perceived than real, as most of the complaints were superficial highlighting the "nuisance" factor of monkeys as opposed to a threat to residents safety or well-being (see Table 6.1). Just fewer than twenty six percent of respondents listed the stealing of food from homes and gardens as the main concern followed by intrusion into homes, listed by approximately nineteen percent. Just over fifteen percent had no complaint and eight percent thought the mess in homes and conflict with pets was cause for concern.

Only six percent were uneasy about potential conflict between monkeys and children, while less than two percent were concerned about safety. Intolerance was mentioned as the nature of the problem by under two percent while fifteen percent of respondents had no complaints but thought rather that humans were the problem.

Table 6.1: The Nature of Complaints on Vervet Monkeys in the Westville Area

Complaint	Percent
Stealing Food	25.76
Intrusion into Homes	19.70
No complaint	15.15
Conflict with Pets	7.58
Mess in Houses	7.58
Conflict with Children	6.06
Damage to Gardens or Homes	6.06
Mess in Gardens	4.55
Over Population	3.03
Noise	1.52
Intolerance by Humans	1.52
Fear	1.52

When asked if residents thought that monkeys were a threat to humans, a convincing eighty three percent thought that they were not (see Figure 6.1). Just over sixty three percent thought the opposite was true, that humans were a threat to monkeys. Of those that did feel that monkeys were a threat humans, reasons given included concerns over safety of their children, comfort and the threat of rabies (see Table 6.1). Of those that considered humans a threat to monkeys, they listed shooting with firearms and pellet guns, crackers, injuries from household pets, stress and starvation as possible threats to monkeys. When questioned on characteristics of monkey visits to residential properties, fifty percent of the respondents felt that the visits occurred on a weekly basis and thirty three percent thought that the visits occurred daily. "Fortnightly", "monthly" and "seldom" were mentioned in small percentages.

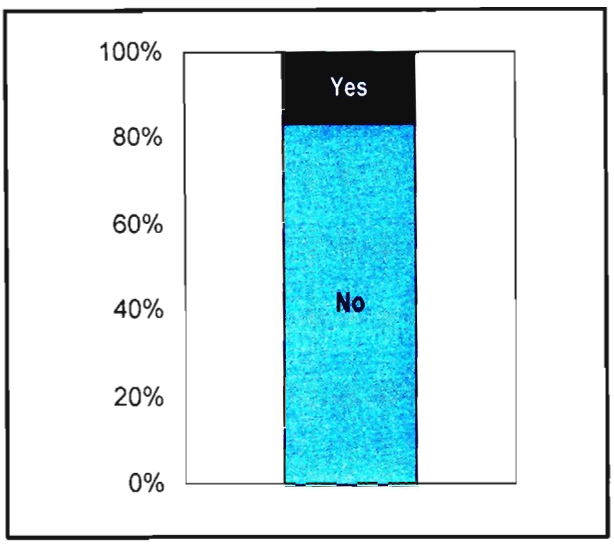

Figure 6.1: Response from Residents when asked if Monkeys are a Threat to Humans?

When requested on average the numbers of monkeys that visit a property, residents were divided, with thirty three percent placing the number between eleven and fifteen, twenty seven percent placing the number at zero to ten and twenty three percent felt visits were made by sixteen to twenty monkeys (see Figure 6.2). Other averages were mentioned by few respondents.

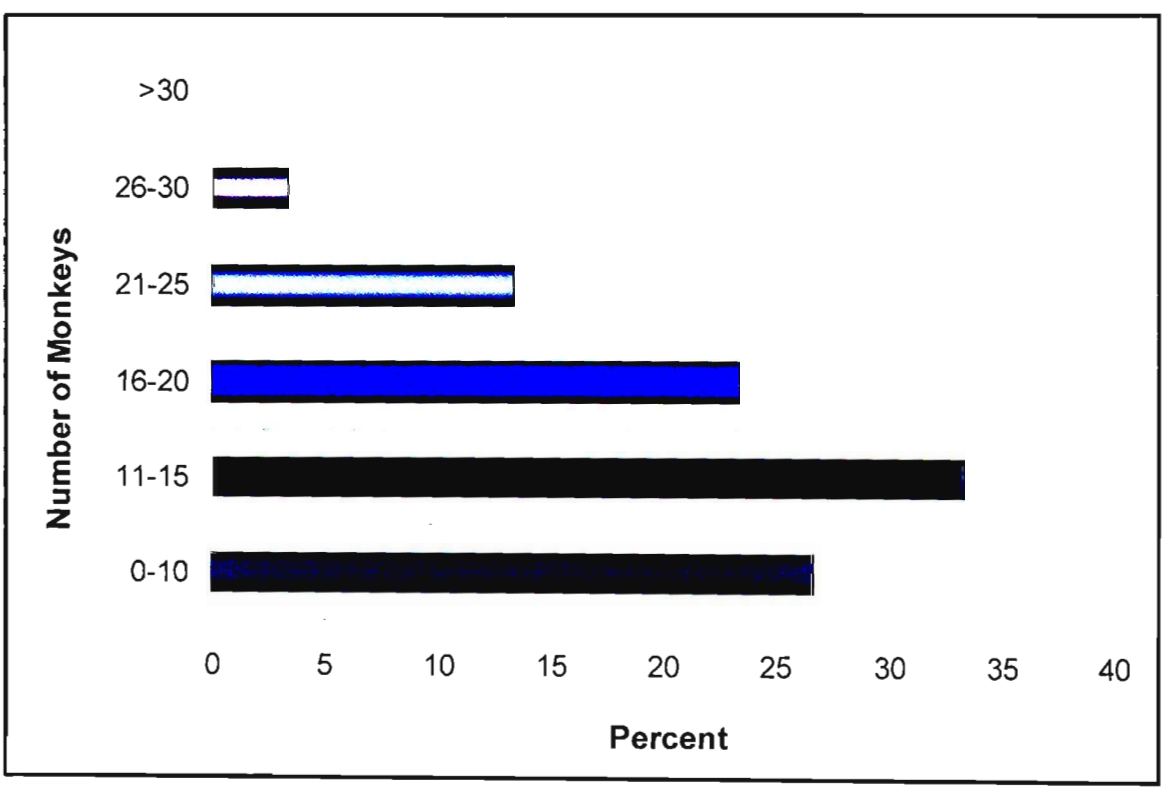

Figure 6.2: Average Number of Monkeys that Visit Properties

The majority of respondents, ninety seven percent, agreed that monkeys carried young. Of those in agreement, seventy six percent felt that there were up to five offspring in a troop at any one time, while fourteen percent though that this number of offspring was between six and ten. When asked if the problem was seasonal, residents were again divided, as fifty percent though the problem was consistent throughout the year and forty three thought that the problem was seasonal, increasing mainly in winter or seasons of drought and scare food supply.

The following section dealt with an assessment of land use change as perceived by respondents. Residents were asked their opinion on the changing nature of the problem with Vervet Monkeys and the land-use structure in Westville over three or so decades. Comparisons were then requested between these two variables in an attempt to identify a link between the land use change and the monkey problem. Residents were again divided on the changing nature of the monkey problem with forty three percent believing that the problem had increased and the forty seven percent believing that the problem had remained the same (see Figure 6.3). A very small percent felt that the problem had decreased.

On the issue of changing land use, sixty three percent thought that open space provision had decreased while thirty three percent felt that the proportion had remained the same. Again, only a small percent felt that open space provision had increased in the Westville area (see Figure 6.3).When asked if land use change had had any affect on the nature of the monkey problem, most respondents, thirty seven percent had no response to the question. Of the remainder thirty three percent thought that the change in land-use had had no associated effected on the monkey problem, while thirty percent though the associated effect was a decrease in the problem. None of the respondents felt that a change in the land-use structure of Westville had resulted in a corresponding increase in the monkey problem.

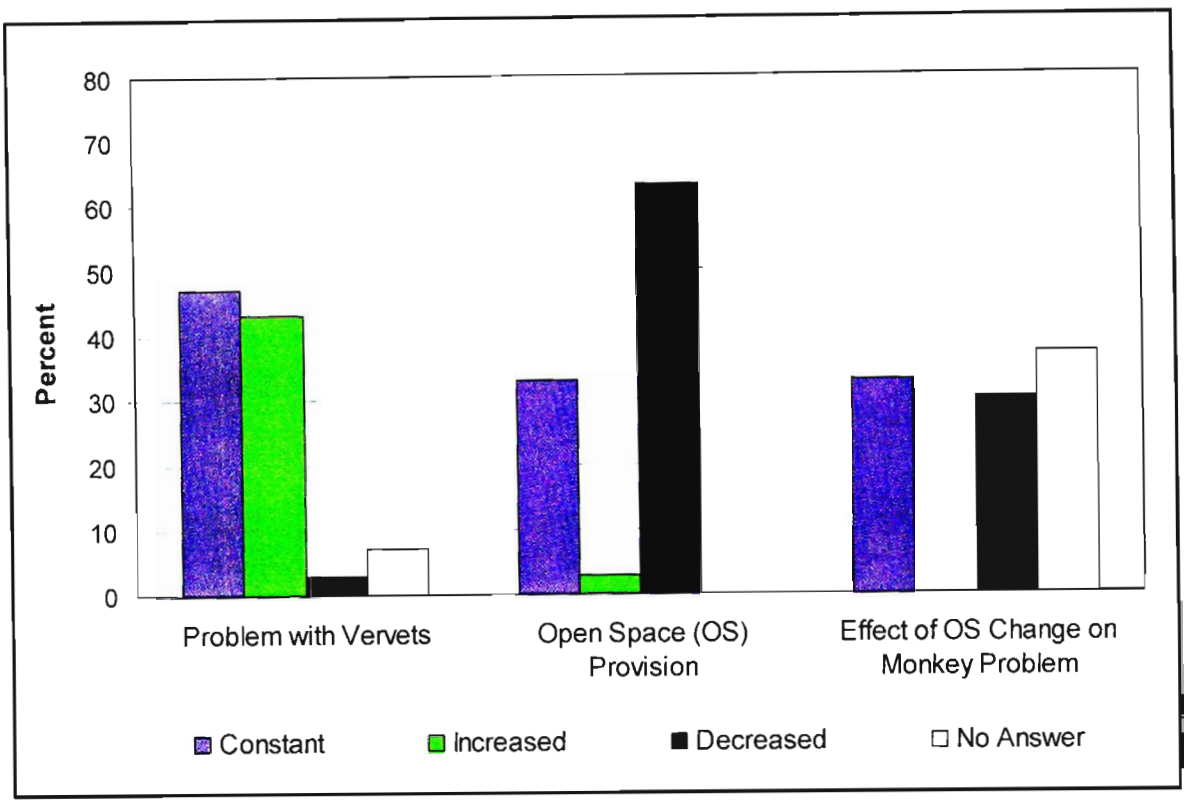

Figure 6.3: Perceptions of Change in the Monkey Problem, Open Space Provision and the Effect of Open Space Change on the Monkey Problem in the Westville Area over Approximately Three Decades

Section two of the questionnaire dealt with residents perceptions on the causes of and influences on the problem. Respondents thought that "everyone" should take responsibility for the problem with monkeys while some felt that "no one" should be responsible for the animals (see Figure 6.4). Formal responsibility was placed mainly with local government and local municipalities by sixteen and eleven percent of the respondents respectively. Other groups mentioned were residents, special organisations and schools.

Respondents were then questioned on a series of factors that had the potential to influence resident's thinking, More respondents, sixty two percent, felt that living within close proximity to a conservancy or nature reserve did not necessarily influence ones opinions of the monkey problem (see Figure 6.5). Conversely, eighty seven percent, a large majority of respondents agreed that education and awareness did influence ones perception of the monkey problem. Religion and spirituality was also thought to play an important role in ones perception, although to a lesser extent, by just over fifty three percent of the respondents.

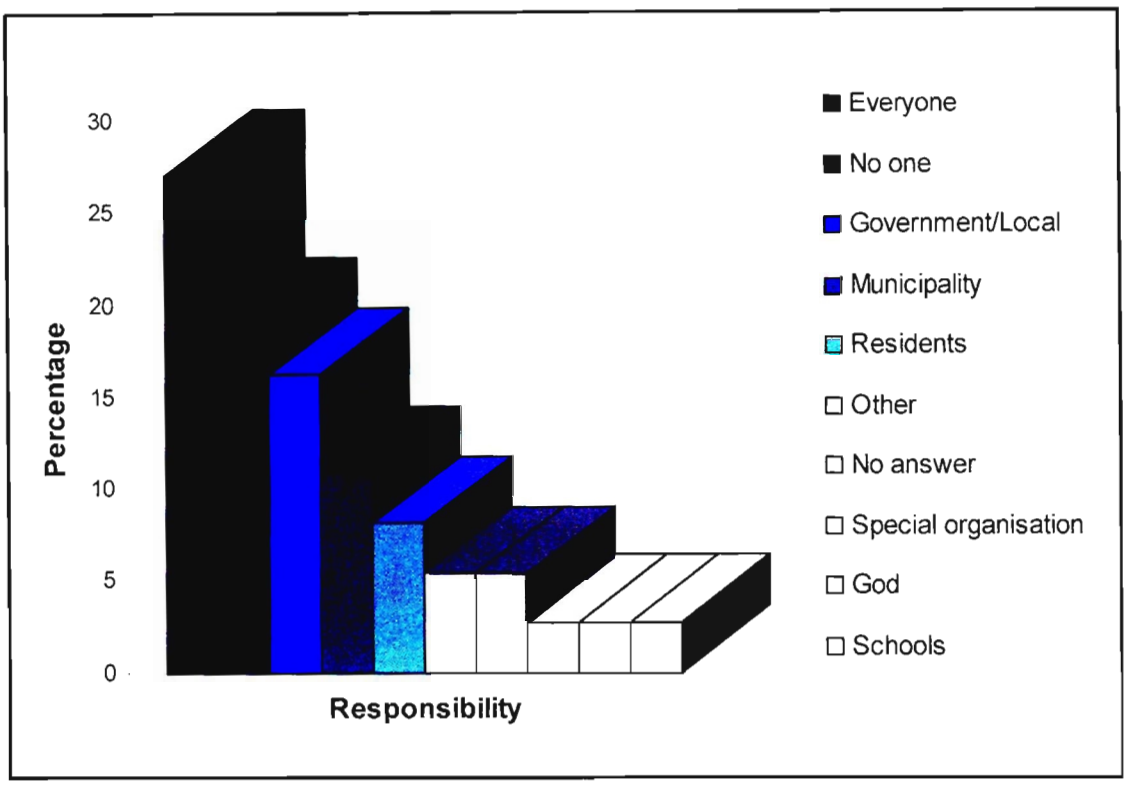

Figure 6.4: Responsibility for Monkeys and the Monkey Problem

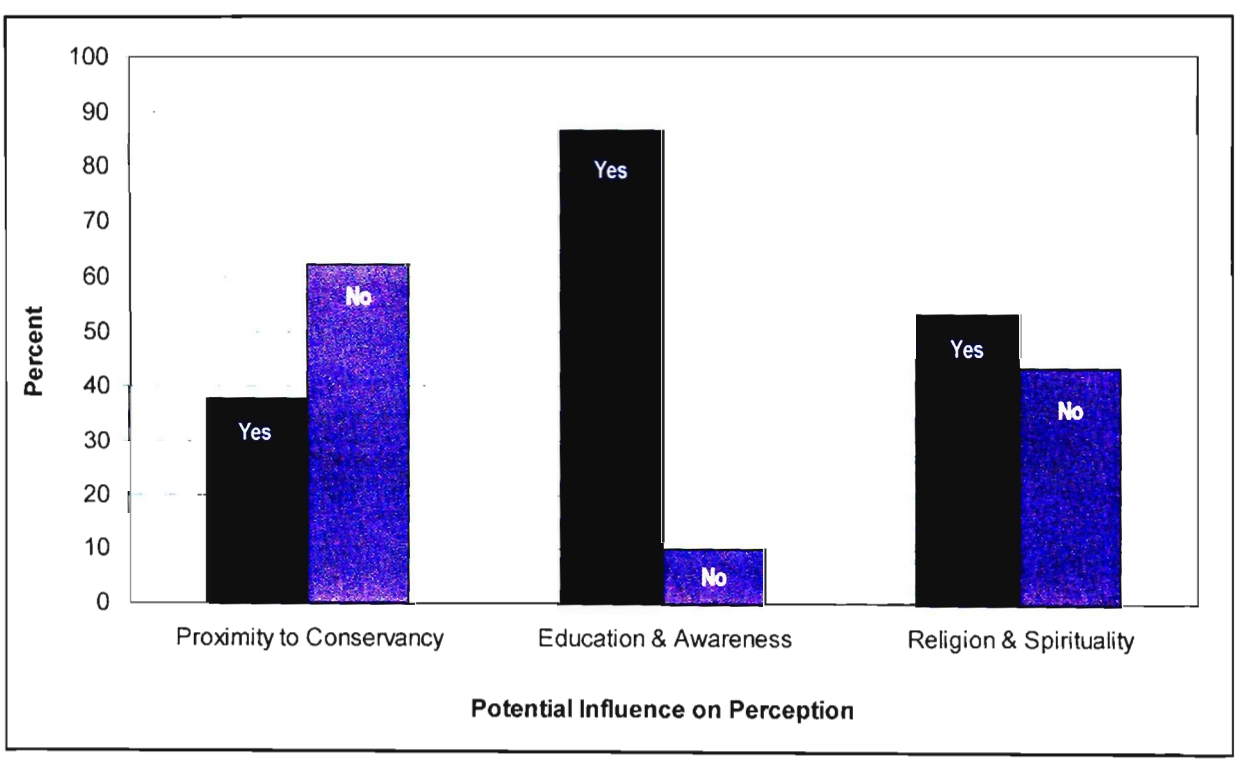

Figure 6.5: Effects of Proximity to Conservancy, Education and Religion on Perception of Monkey Problem

Although, as stated above, the majority respondents did not feel that living in close proximity to a reserve or conservancy influenced ones perception, all respondents placed personal value on living near an open space. Proposed solutions by respondents to the monkey problem were vast and varied, but the highest scores, seventeen present, fourteen percent and ten percent were allocated to education, preservation of existing open space and tolerance respectively (see Figure 6.6). Other proposed solutions were culling, relocation and controls over feeding stations. There were other solutions mentioned that are related to preservation of open space which included reducing the rate of urbanisation, increasing vegetation and maintaining corridors.

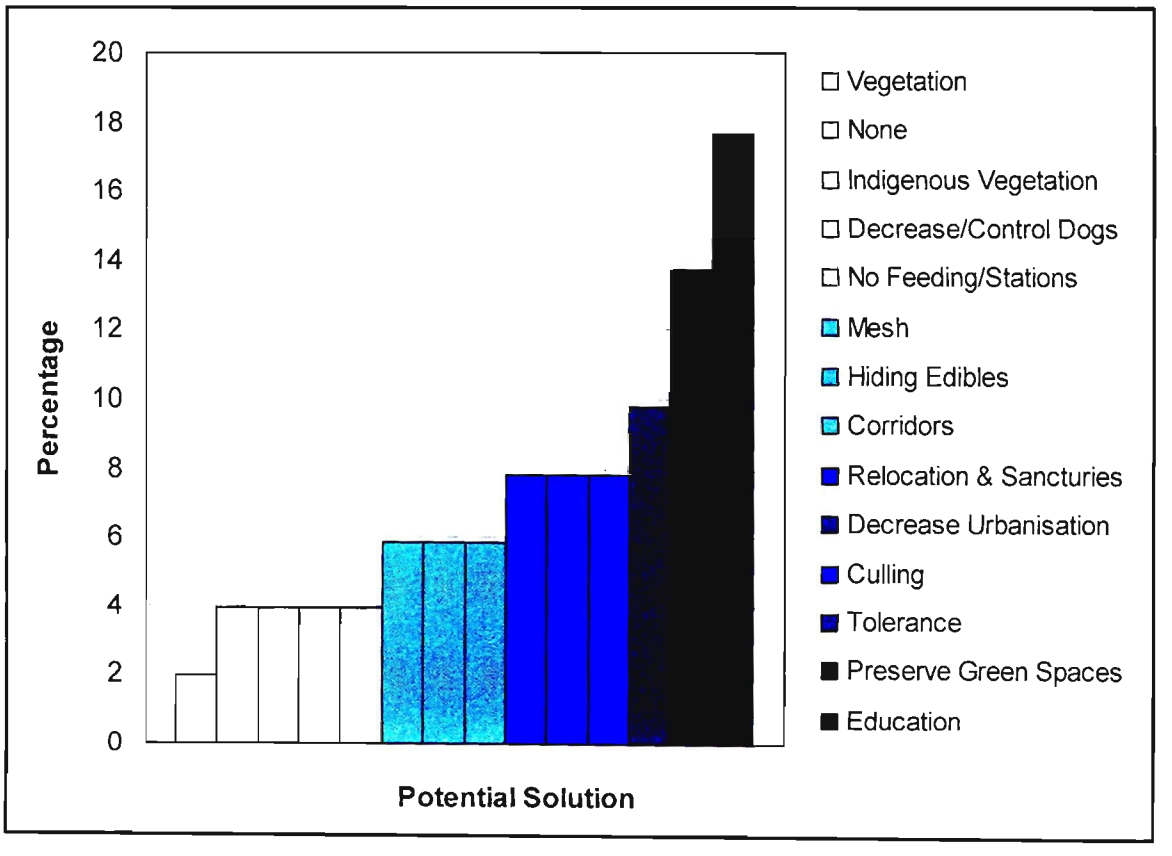

Figure 6.6: Proposed Solutions by Residents to Monkey Problem

Residents were then asked if there would be willing to modify aspects of their gardens to accommodate monkeys or alleviate the problem, and seventy percent said that they would be willing to do so. While a large percent of these respondents were unsure of what they could do in this respect, many thought that maintaining vegetated corridors along garden edges would be useful modifications to make to assist in alleviating the problem.

Section three of the questionnaire dealt exclusively with demographic information on each respondent. The respondents address was requested at the outset for future input into a Geographic Information System (GIS) database to assess the relationship, if any between the extent of the monkey problem and the location in relation to either the Palmiet or Roosfontein Nature Reserve.

Between eleven and twenty years was the period of residency in Westville of forty percent of the respondents, while twenty percent lived at their residence between six and ten years. Both categories of occupation between zero to five years and twenty one to thirty years had values of seventeen percent and just over six percent occupied their residence between thirty one and forty years. None of the respondents had occupied their current home for more than forty years, although some indicated living in different residences within Westville, for a combined period of longer than forty years. The age structure of the respondents showed a high response rate, of thirty percent in the age group fifty six to sixty five, followed by twenty seven percent in the forty six to fifty five age group (see Figure 6.7). About seventeen percent of respondents fell into the "over sixty five" category and ten percent fell into the twenty six to thirty five category. There were no responses from the "under eighteen" group and "eighteen to twenty five" group.

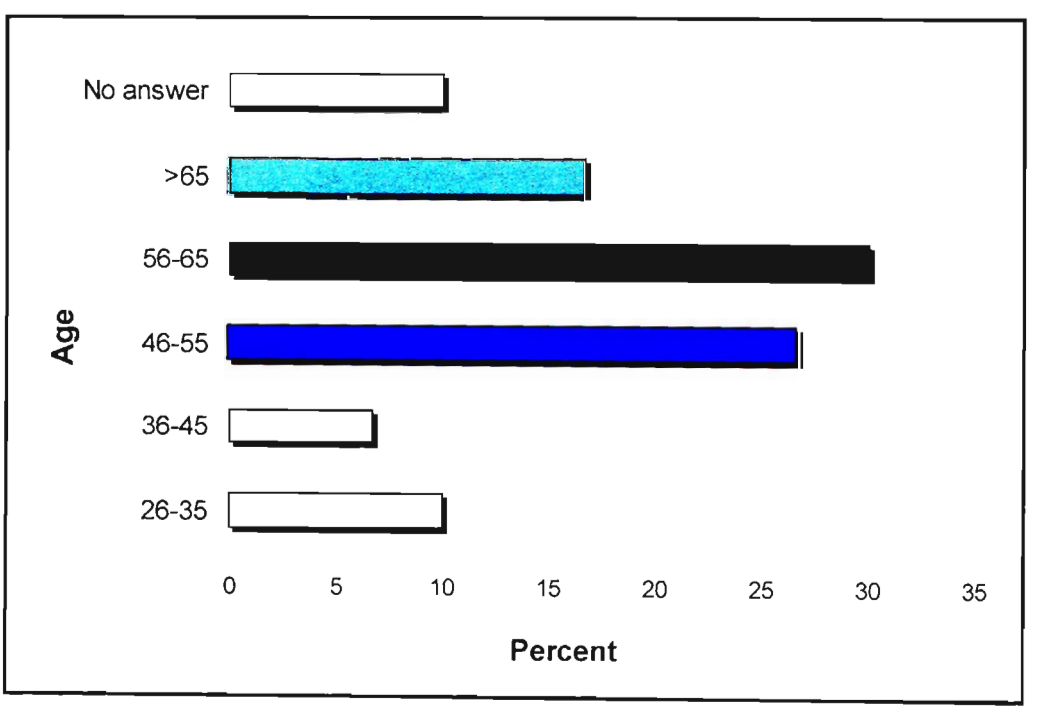

Figure 6.7: Age Structure of Questionnaire Respondents

Most of the respondents were male, approximately thirty percent more than females (see Figure 6.8). All respondents had some form of formal education, with fifty percent holding post graduate degrees, forty three percent with undergraduate degrees and seven percent with senior secondary qualifications.

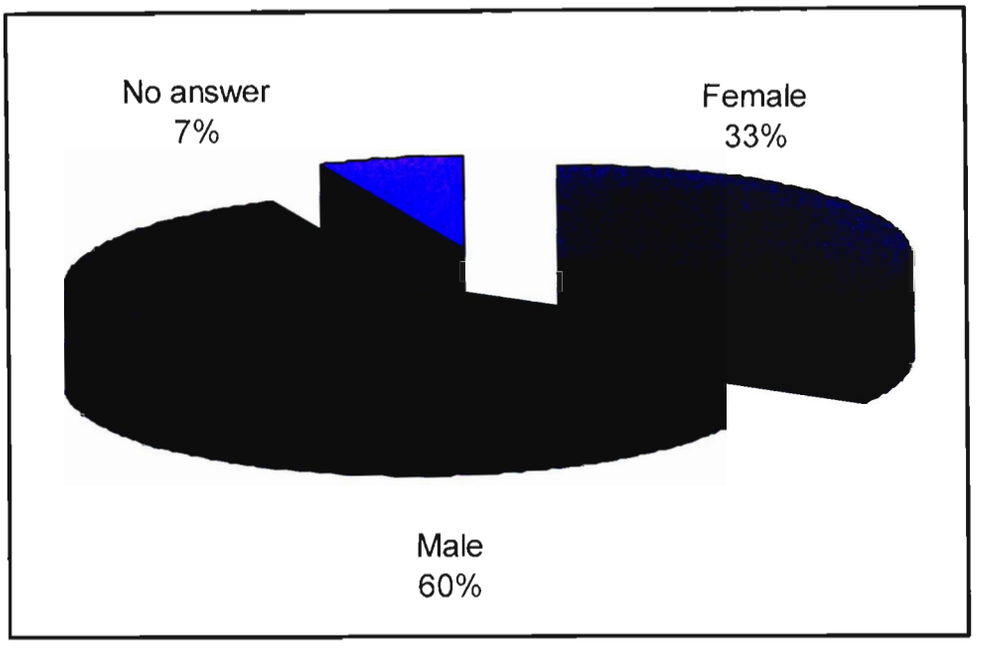

Figure 6.8 Genders of Questionnaire Respondents

When asked if respondents belonged to any environmental associations or groups, sixty seven percent of respondents indicated that they did. Table 6.2 lists these. Westville Conservancy was the most popular followed by the Wildlife and Environmental Society of South Africa (WESSA) and another conservancy of the Westville area, Umvusi Conservancy. The Palmiet Nature Reserve Management Committee held a membership of four percent.

The final section of the questionnaire involved a garden survey from each respondent. Between one thousand square meters (m^2) and two thousand m^2 was the average size of gardens of fifty six percent of respondents, while seventeen percent had gardens sized between three thousand m^2 and four thousand m^2. In the two thousand m^2 to three thousand m^2 category there was ten percent and seven percent in the "less than one thousand m^2" category.

Table 6.2: Environmental Associations / Groups to which Respondents Belong

Association / Group	Percentage
Westville Conservancy	29
No answer	21
WESSA	18
Umvusi Conservancy	11
Bird Life South Africa	7
Palmiet Nature Reserve Management Committee	4
Ezemvelo KwaZulu-Natal Wildlife	4
Botanical Society of South Africa	4
Other	4

Residents were also asked to assess the extent of alien invasion in their gardens. Figure 6.9 shows five categories of the invasion of alien plants in percentages, and the corresponding number of responses that fall within each category.

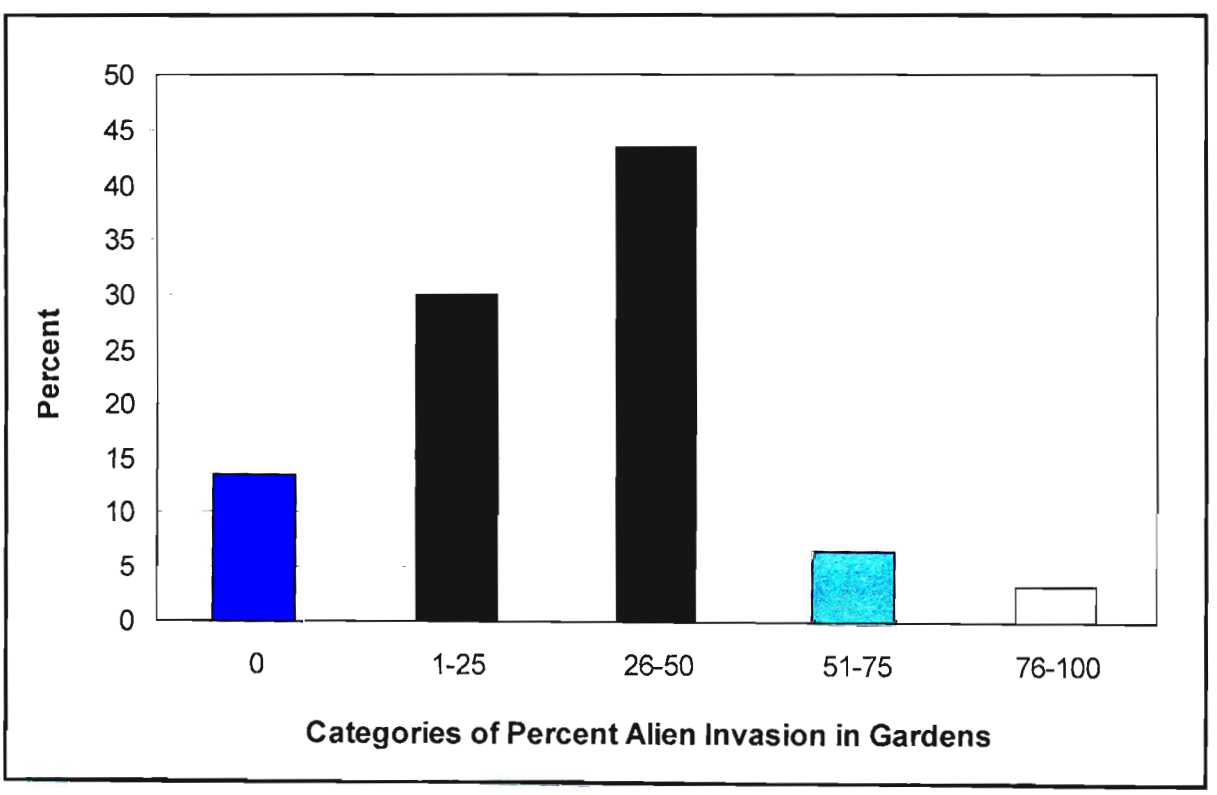

Figure 6.9: Extent of Alien Invasion in Gardens of Respondents

The category of invasion between twenty six and fifty percent was selected by most residents, forty three percent, while thirty percent of respondents experienced alien invasion covering between one and twenty five percent of their yard. The other categories had fewer responses as only three percent experienced between seventy six and one hundred percent invasion in their gardens, while thirteen percent of respondents indicated that their gardens were completely weed free.

This section presented the results of the questionnaires, which were administered to residents of the former Westville Borough. The results were analysed quantitatively and presented in statistical form. Results that showed noteworthy patterns or trends were illustrated by graphs or tables. Overall, the section offered valuable insight into the nature of the monkey problem as perceived by residents, the effects of different factors on their perception of the problem and potential solutions to the problem. The following section presents the results of the interviews providing more detailed responses and explanations.

6.3. Interviews

Using methods described in Kitchin & Tate (2000), interviews were analysed by dividing questions into five broad explicit themes and in turn dividing the responses to each question into smaller implicit themes. This was done by grouping all the responses to a particular question from each interviewee together and then identifying links within each individual question. The basic answers to each question were coded and the data was then interrogated further in an attempt to identify significant reasoning behind or motivation for particular answers, Results are presented by quoting actual numbers, as the total number of interviewees was ten, making statistics easy to visualise. Where interviewees offered more than one response, percentages were calculated.

6.3.1. Nature of the Problem with Vervet Monkeys

The actual nature of the problem with Vervet Monkeys, as viewed by stakeholders, fell into one of four categories: “no problem”, “nuisance”, “safety” and “cause”.

Some respondents did not believe that monkeys were a problem but offered their views in their professional capacity, nevertheless, on the problem as viewed by urban residents. The most mentioned complaints by interviewees were stealing of food, intrusion and mess, which contributed to twenty three percent, eighteen percent and fourteen percent respectively of the total responses. These complaints reflected the problem of monkeys as pests or nuisances, and noted that these were the most common complaints from residents who could not deal with the irritation of monkeys entering homes and gardens, stealing their edibles and making a mess in their homes and yards. Butler (pers. comm., 03/11/04) explains that monkeys are opportunistic animals, and especially when fruit trees are bare, intrusion into peoples home and gardens is common. People feel that they have to close their houses and this causes hostility and resentment. Cottrell (pers. comm., 07/03/05) has heard of cases of "*kitchens being raided for food and uneaten food being left strewn all over,*" but insists that in the thirty six years that he has lived in Westville the monkeys have only entered his home once despite open windows once because there was no food visible. He adds that "*they tend to move around the property at an upper level, following trees and the roof, mainly because we had a Spaniel that chased them, but even now that the Spaniel is dead, they still seem to keep mainly to their higher route and seldom come down to ground level.*"

Some respondents thought that the issue of safety was of concern to residents. Issues like conflict with pets and children and general safety were mentioned. Thompson (pers. comm., 27/10/04) had no personal complaint about the monkeys but felt that they could be a danger when they ran across roads and motorists had to swerve to avoid them.

Some respondents thought that potential causes of the problem reflected the actual nature of the problem. Reasons like ignorance, the loss of habitat and feeding stations were listed as fifteen percent of the total responses. Smit (pers. comm., 28/10/04) explained that a lack of understanding of the problem and behaviour led to exaggeration of numbers. Regarding habitat destruction, in addition to restricting the movement of monkeys, Smit explained that inter-troop conflict had increased as monkeys are territorially bound.

Foraging territory overlapped and troop fighting occurred. This also increased the perception of danger to residents who interpreted the coughing noises made by monkeys during this time and the fights between monkeys as a danger to themselves. Thusi (pers. comm., 09/11/04) of Ezemvelo KZN Wildlife who also attributed the problem to habitat destruction and land use change, stated that "*areas that were predominantly grassland are now patches of forest – areas that would not have had monkeys.*"

The remaining respondents felt that there was no monkey problem at all and Senogles (pers. comm., 29/10/04) and Baker (pers. comm., 17/11/04) thought that rather than a monkey problem there was a "*people problem*" and that monkeys were just a nuisance.

Interviewees were asked if they thought that monkeys were a threat to people living in the Westville area. A total of nine respondents indicated that monkeys were of no threat to humans, but added that they were perceived to be a threat by some for various reasons. Smit (pers. comm., 28/10/04) explained that people tend to place human characteristics on monkeys, like vindictiveness which is inappropriate. People think that they might be attacked by aggressive monkeys but "*Vervets rarely attack, they rather threaten. They bite only in extreme circumstances. They might scratch, but still rare. Only when you physically attack them or a troop member.*" Butler (pers. comm., 03/11/04) added that "*they are perceived as a threat. They are not. A male Vervet weighs seven to eight kilograms. You may be in danger if they are cornered. They would bite.*" In agreement Baker (pers. comm., 17/11/04) stated that "*In 16 years of working in the field there was never an incident. If under extreme threat, in an instance like that a monkey would take a snipe. But they don't put themselves at risk and they don't attack humans.*"

Rabies was another perceived threat amongst residents. Interviewees agreed that rabies was not a valid concern. Smit (pers. comm., 28/10/04) explained that "*rabies is not a factor. Can contract rabies but they are not carriers and it is difficult for a monkey to contact it.*" Butler (pers. comm., 03/11/04) agreed and stated that "*there were no known cases of monkeys transmitting rabies or any other disease.*"

Armstrong (pers. comm., 01/11/04) indicated that monkeys could be a threat to humans when a lone bull behaved in an aggressive way towards humans. Smit (pers. comm., 28/10/04) described this process whereby ousted males became hostile and violent as "*displaced aggression.*" When "*there is a lone male that has been ousted from the troop and is still suffering the humiliation.*" This male might attack other animals like dogs, cats and birds and would also attack baby monkeys. In this way a monkey might be a threat to pets but this again was rare and a monkey was not vindictive to specific animals.

When asked if humans were a threat to monkeys, all ten respondents agreed that they were. Threats were divided into two categories; "direct or malicious" which listed all the causes of harm that were purposefully inflicted by humans on monkeys and "indirect or accidental" which indicated all the affects that occurred as an indirect result of human actions or contact (see Table 6.3).

Table 6.3: List of Direct and Indirect Threats to Monkeys by Humans

DIRECT / MALICIOUS	INDIRECT / ACCIDENTAL
Shooting (pellets and firearms)	Car accidents
Setting pets on monkeys	Shocking by electric fences
Throwing stones	Disease
Killing	Lack of food
Children abusing monkeys	Lack of habitat
Poisoning	Inter-troop conflict
Traps	Threat to numbers – extinction
	Further development
	Containment

Injury to monkeys by direct or malicious intent was caused mainly by pellet guns or a firearm as shooting was seen as a quick fix to the problem. Smit (pers. comm., 28/10/04) believed that there had been a 500% increase in the number of pellet gun injuries to monkeys since the lift on the ban on pellet guns. He explained of pellet gun advertisements, "*Marketing of pellet guns: for getting rid of animals and vermin.*"

Shooting often resulted in terrible injuries as the monkeys were not always killed and there had been an increase in car accidents because the monkeys had pellets lodged in them and ran across roads disorientated. Butler (pers. comm., 03/11/04) felt that shooting was probably the biggest threat to monkeys. "*They sometimes get killed and sometimes don't. Injured animals go to CROW and if they can't be saved they are put down*. He added that "*there's no penalty for shooting. Classes as Vermin gave farmers the right to shoot them. In an urban area you can not discharge a firearm without your life being in danger. So if we want to prosecute, that would be the law to use*." Thusi (pers. comm., 09/11/04) from Ezemvelo KZN Wildlife explained that when an animal is shot, it is sometimes injured instead of killed and this exacerbates the problem as the animal is disorientated and has to fight to defend its self. He added that "*If somebody interferes with wildlife in some way, we take legal action against the person. Investigation and then if there is evidence, then we take the matter to court*." Both Butler and Thusi stressed, however, the problems associated with identifying the culprits who interfere with wildlife or discharge a firearm in public.

Poisoning, trapping and stone throwing were other ways in which humans injure or kill monkeys. In addition, pets sometimes bite monkeys and children thrown stones and injure monkeys. In all of these instances, monkeys can be killed or injured and, as explained above, an injured monkey might become a great threat to humans and other animals that encounter it.

The indirect threats to a monkey's livelihood included habitat destruction and or increased urbanisation which in turn had various consequences. A reduced home range and closer proximity to humans increased the threat from humans to monkeys. Baker (pers. comm., 17/11/04) had seen numerous cases of monkeys being shocked or electrocuted with electric fences and monkeys being knocked on roads by motorists. Fitchit (pers. comm., 10/11/04) had seen cases of monkey tuberculosis (TB) contracted from humans. The reduced space also led to reduced food availability and inter – troop or territorial fighting. Containment also makes monkeys easy targets for predators and gives monkeys less chance of survival when threatened by a catastrophe such as fire or drought.

Limited space also increases the possibility of interbreeding which produces genetically weak off spring. Smit (pers. comm., 28/10/04) saw humans as the major threat to monkeys. He explained "*wild predators never controlled monkey numbers. Numbers are controlled by the size of the territory and availability of food and water. At what level can an animal prey on an animal that is territorial bound without driving them to extinction?*" Reduced open space therefore has a double effect of decreased habitat for the monkeys making them vulnerable as well as increased contact with humans, who in turn act as predators to the animal.

Respondents had vast and varied reaction when asked what they thought was the cause of the problem with Vervet Monkeys. Responses were subdivided into two types of causes; "long term or indirect" and "short term or direct." The former group refers to causes that affect monkeys indirectly and require broad holistic solutions while the latter group refers to causes that directly trigger human-monkey interaction and therefore conflict.

Long term or indirect effects included a decrease in open space or increase in urbanisation, climatic conditions, intolerance, lack of education and selfishness. On the cause of the problem between humans and monkeys, Smit (pers. comm., 28/10/04) stated that "*habitat destruction is the single biggest cause. Aligned to the destruction in habitat is an increase in the interaction between humans and animals in those areas that humans consider to be their space.*" Fitchit (pers. comm., 10/11/04) agreed by stating that problem was "*definitely not due to an increase in population but smaller area.*"

Butler (pers. comm., 03/11/04) reiterated that the problem was just perceived and that monkeys were just a nuisance. He therefore attributed the conflict to a general lack of understanding by the public as monkeys will not enter a house to steal something they can't see. Residents were requested to put edibles away and "*generally people are accommodating but some people don't feel they should be tolerant. My response is that if you are not prepared to take one small step to solve the problem they you can live with the consequences.*" Senogles (pers. comm., 29/10/04) & Baker (pers. comm., 17/11/04) also attributed the problem to a lack of understanding, ignorance and arrogance.

Senogles further explained that natural animal instincts in humans led to defensive behaviour which was part of the problem. Brigg (pers. comm., 01/02/05) attributed the problem to changes in climatic conditions which resulted in periods of drought. Subsequently, monkeys spread themselves wider to look for food.

Short term direct causes included the presence of feeding stations in an urban area and easy access to food. According to respondents, feeding stations concentrated the problem (discussed later), while the visibility of edibles in homes enticed monkeys who otherwise had to forage for food in open spaces and gardens. When asked if they considered the problem to be seasonal or consistent, eight respondents considered the problem seasonal and two consistent throughout the year. Of the respondents that indicated the problem to be seasonal, five explained that although the problem was present throughout the year, there was a slight increase in winter and periods of drought. Butler (pers. comm., 03/11/04) said there were fewer complaints in the wet season and quite a few calls in the dry season but overall the pattern fluctuated. Thusi (pers. comm., 09/11/04) explained that "*monkeys that are isolated away from their natural habitat, they will be a problem throughout the year, but those that are near open spaces will be drawn out during times of scarce food.*" Smit (pers. comm., 28/10/04) associated the end of winter with less growth and less camouflage and therefore an increased need for food, water and shelter by mid to late winter. Mating season at the end of April also resulted in fighting for food and water and therefore a perceived increase in the problem.

An assessment of the nature of the problem with monkeys showed that complaints were related to the threat of monkeys, the nuisance factor of monkeys or the cause of the problem while some respondents had no complaints. While respondents did not feel that monkeys were of a great threat to humans, they definitely thought the opposite was true. The cause of the problem was attributed to short term factors like the presence of feeding stations and access to food, and long term causes like habitat destruction. The problem was thought be mostly consistent but slightly increased in winter.

6.3.2. Land Use Change and Associated Implications for the Monkey Problem

When asked if the monkey problem had increased, decreased or remained the same, eight of the respondents thought that it had increased, two believed that the problem had remained the same and one respondent was unsure. Those that thought the problem had increased agreed that the number of monkeys had decreased but the interaction between humans and monkeys had increased. Smit (pers. comm., 28/10/04) attributed the escalated problem to increased interaction between humans and monkeys and not to an increase in the number of monkeys. Senogles (pers. comm., 29/10/04) also felt that the number of monkeys had decreased as she keeps a count of the number of members per troop. She believed that there was a perceived increase in the problem because of greater contact and because "*non – coastal people and people moving out of flats see the numbers as greater.*"

Fitchit (pers. comm., 10/11/04) explained that "*troops that used to be quite large are smaller and are confined to a much smaller habitat but people perceive them as more.*" While Cottrell (pers. comm., 07/03/05) did not remember monkeys visiting his home while growing up in Westville, Baker (pers. comm., 17/11/04) and Butler (pers. comm., 03/11/04) felt that problem fluctuated with each year and so did perceptions held by the public and the nature of press coverage. Thusi (pers. comm., 09/11/04) attributed the increased problem to the lack of an "*integrated management approach with other government departments like housing, agriculture and so on. If these do not tie up we will have a problem.*" Baker (pers. comm., 17/11/04) did not agree that the numbers had decreased but believed rather that the conflict had increased because Westville was now developed.

None of the respondents thought that open space provision had increased in Westville over the last three decades. A decrease in open space was noted by eight of the respondents who described changes to the land use structure that they thought affected wildlife in the area. Smit (pers. comm., 28/10/04) thought that in addition to an overall decrease in habitat, the recent presence of "*squatters*" in Westville had resulted in mass de-vegetation and modification of the landscape.

Subsequently, residents in the area cut down their trees to avoid being inundated with requests by these informal residents for fruit to sell at the market. Senogles (pers. comm., 28/10/04), Armstrong (pers. comm., 28/10/04), Cottrell (pers. comm., 28/10/04) and Fitchit (pers. comm., 28/10/04) agreed that the land use structure had changed completely in Westville over the last three decades, with increased development, hard surfaces, subdivision and re – zoning.

In contrast Butler (pers. comm., 03/11/04) and Brigg (pers. comm., 01/02/05) thought that the area of Westville had maintained a good balance between development and open space provision. Butler stated that despite the recent growth boom in the Westville area, the increased size of the Palmiet Nature Reserve coupled with the preservation of "*lots of little in between open space*" meant that Westville had maintained "*not a bad balance*." Brigg explained that the decentralisation trend of the previous decade resulted in increased development in Westville, which was considered a good area to live in, but argued that the planning department fought very hard to maintain open space. He stated that "*Westville has actually been very fortunate despite all the land use changes and increasing density of people and traffic and things like that. Westville is fortunate because it's been well vegetated and a lot of trees and gardens have been bigger than more areas.*" Brigg did not believe that subdivision was significant in Westville like in areas like Hillcrest, and that subdivision did not necessarily increase density, except in a few cases. In these exceptions, the council attempted to regulate the type of vegetation used in the gardens and the orientation of the development, allowing for sufficient room along the perimeter of the development. Thusi (pers. comm., 09/11/04) also felt that Westville had ample natural habitat but also thought it unfair to comment as his experience in that area was limited.

Once respondents were sorted into work categories (i.e. NGOs, government) an interesting pattern is seen of land use change perceptions. All interviewees that worked for NGOs thought that open space provision had decreased in Westville, while the government employees showed a difference in opinion. Two agreed that open space had decreased, but not significantly. And the remaining two government employees did not think that open space provision had decreased at all.

The change in land use was thought to have associated implications on the monkey problem eight of the respondents while the remaining two did not think that land use had changed. The main effect of the change in land use in Westville was thought to be the increased interaction between monkeys and humans due to limited space. Smit (pers. comm., 28/10/04) believed that "*thirty years ago I know there was not the level of human – monkey conflict then that there is now. There was a lot more bush around and people were a lot less threatened by the presence of the animals because of a lot less contact with them.*" Senogles (pers. comm., 29/11/04) agreed that there was increased interaction between monkeys and humans and believed that this led people to perceive the problem as greater and overestimate the number of monkeys that enter their property. Fitchit (pers. comm., 10/11/04) also thought that the problem was now perceived as greater due to increased contact of monkeys with humans and importantly with other troops. As monkeys are highly territorial, the over – lapping of troops in these congested areas leads to fighting over limited resources. She explained that "*monkey aggression means the problem is perceived as greater during fighting times with monkeys running everywhere and screeching and being pushed into gardens.*" Butler (pers. comm., 03/11/04) also highlighted the increased perception of danger during territorial fighting as "*people perceive that threat greater during times of troop conflict. People are alarmed. There is very little pain or injury and only between males and has nothing to do with humans.*

Butler (pers. comm., 03/11/04) and Thompson (pers. comm., 27/10/04) added another argument to the land use change debate. They both felt that the change in vegetation types had aggravated the problem. Thompson believed that the replacement of indigenous vegetation with manicured, ornamental gardens had affected monkey behaviour. The monkeys now concentrate on specific areas or specific gardens with fruit trees and avoided these artificial surroundings. Butler on the other hand believed that the change in vegetation structure had created an optimal environment for monkeys to inhabit.

He explained that monkeys were arboreal animals by nature and "*the area* [Westville] *is historically grassland and monkeys would have utilised forest patches but foraged in the grasslands as well, close to trees. Urbanisation has forested urban open spaces. So all ridges which were grassland are now forested. They have now created a more ideal habitat for monkeys. But now the population is bigger than you would have historically.*"

Overall, interviewees agreed that open space provision had either decreased or remained the same and those that felt that open space had decreased also agreed that this had associated implications on the problem with monkeys including increased interaction between humans and monkeys and a perceived increase in the problem.

6.3.3. Influences on Perceptions and Problem

Interviewees were questioned on six factors that might have influence on the nature of the problem, and asked whether they felt that these factors played any role in influencing people's perceptions of the problem, or offered a potential solution.

(a) Environmental Impact Assessments

Initially interviewees were questioned on EIAs and their potential role in managing urban wildlife, and nine of the ten respondents indicated that EIAs have played no role in mitigating the problem. The remaining respondent was unsure. Thompson (pers. comm., 27/10/04) felt that EIAs were only useful for "*red data species*" and that she had never heard of monkeys being brought up anywhere. She also did not think that development would ever be modified for the sake of monkeys. Smit (pers. comm., 28/10/04) was harsh when addressing the topic of EIAs. He felt that they were "*grossly deficient at best and completely useless at worst*" and questioned '*how many decent impact assessments have you seen?*" In addition, Smit explained that EIAs only took into account large developments and ignored smaller individual sites which then added up to produce a cumulative effect.

Armstrong (pers. comm., 01/11/04) thought that the problem with EIAs was the lack of monitoring or follow – up procedures and asserted "*it's ok to ask for an EIA but you need someone that's qualified to receive that impact assessment and to see, does it go far enough and to see if it's implemented. If there's no follow up it's not worth the paper it's written on.*" Fitchit (pers. comm., 10/11/04) agreed with Armstrong and furthered explained the problem with the lack of habitat preservation "*we see no evidence that EIAs are enforced. And there is not enough of them for preservation of natural habitat. They target sensitive areas which are visible and immediate like wetlands, but nothing targets habitats as a whole.*" Baker (pers. comm., 01/02/05) also had concerns over enforcement, "*monitoring and control are always a problem. There are limited resources and developers look like they will do something and they don't and then the owners of the place take over.*"

Butler (pers. comm., 03/11/04) added that monkeys had never been discussed in an EIA, except once with the development of Lourie Park. He felt that "*the only thing an EIA can do is recognise the fact that the people who move into the development are going to have to put up with monkeys. It will be brought up just for awareness.*" Butler added that on a broad scale one can address the habitat issue as a whole, but that would never stop development and it should not. Respondents felt that the EIA law had too many loopholes for it to be effective. In addition to the lack of assessment of cumulative effects and assessment confined to mostly sensitive areas, EIAs ignore the plight of wildlife as a separate entity. Fitchit (pers. comm., 10/11/04) explained that EIAs did not cater for wildlife, monkeys or otherwise and Smit (pers. comm., 28/10/04) argued that some EIAs had addressed the issue of monkeys but wildlife generally were ignored and he [Smit] was "*not sure if they are ever taken into account during development*". Baker (pers. comm., 17/11/04) agreed, explaining that monkeys have never been considered as they were considered unrelated. He felt that an EIA only looked at mitigating effects of a particular development and ignored long term effects. Brigg (pers. comm., 01/02/05) did not think that any EIA had ever dealt specifically with monkeys, but thought that some dealt with wildlife like Lourie Park and added that "*the law is inadequate and doesn't provide for wildlife. Maybe on water courses but not directly.*"

Thusi (pers. comm., 09/11/04) felt that EIAs had not played a role in wildlife management but felt that future development should take into account these issues. But there was a need for a balance between this and peoples needs as political issues played a huge role in decision making.

(b) Corridors

Interviewees were asked to describe what they thought would be the effect of a well maintained corridor system in an urban area, with respect to the monkey problem. It was thought by six of the respondents that the effect would be positive, one respondent thought a corridor would have both a positive and negative effect; one expected a negative effect and the remaining two respondents thought that there would be no effect.

While Armstrong (pers. comm., 01/11/04) thought that well stocked corridors would be a success for confining monkeys to open space, most others felt that the presence of well vegetated corridors would alleviate the problem but not solve it entirely. Thompson (pers. comm., 27/10/04), Senogles (pers. comm., 29/10/04), Thusi (pers. comm., 09/11/04) and Fitchit (pers. comm., 10/11/04) all agreed that monkeys would probably spend less time around threatening humans if corridors and reserves were well stocked with fruit and allowed migration, but would appear in times of food shortages or if a persons garden had ample trees and an abundance of fruit. Migration would also allow then to reach areas of less conflict. Fitchit added that most people forget about access to water when planning for wildlife and corridors would allow these animals access to fresh water.

Smit (pers. comm., 28/10/04) agreed that corridors would assist the animals in terms of access to food and paths to travel along away from dangerous roads, but would also make monkeys easy prey as their movements would be predictable. As some humans eat monkeys and use their body parts for rituals, monkeys traversing via corridors would be easy targets in unmonitored environments. A potential solution to that problem would be to have a choice of corridors for animal movement, making their movement less predictable.

Brigg (pers. comm., 01/02/05) and Butler (pers. comm., 03/11/04) both felt that monkeys would not stick to corridors as access to food was much easier in a residential area. Butler added that the movements of monkeys were too random to predict but corridors would benefit in terms of diversity as a whole. Baker (pers. comm., 17/11/04) thought that corridors would affect smaller less mobile animals that found it harder to migrate, rather than monkeys who are able to scale walls, fences and trees. Cottrell (pers. comm., 07/03/05) thought corridors would have a negative impact as monkeys would now have access to areas that they would otherwise be restricted from and this would increase contact with humans.

(c) Feeding Stations

Interviewees were asked the effects of feeding stations on the problem and eight of the respondents thought the effect was greatly negative. One respondent thought that feeding stations would be acceptable in some circumstances and the remaining respondent was unsure.

The reason given by most respondents, who thought the effect of feeding stations were negative, was that a constant supply of food socialised the animals and concentrated them in one area. Butler (pers. comm., 03/11/04) listed the negatives of feeding monkeys "*Vervet Monkeys should not be accustomed to being fed in the same place. They should forage. Natural movements will be impacted on. The same people would have to endure them everyday. Abnormal to spend prolonged times in one area. Often ask people to investigate and often someone is feeding in an area. Great problems and they don't move and become a great nuisance. It socialises them in the long term.*" Fitchit (pers. comm., 10/11/04) added to the discussion by explaining that "w*hen people who feed move away, these monkeys and babies have been socialised which a death warrant.*" Thusi (pers. comm., 09/11/04) stated "*KZN Wildlife does not support feeding stations because we do not support feeding wildlife. We do understand that the environment has already been altered, but we don't support feeding stations.*" He did not explain why this stance is taken.

Thompson (pers. comm., 27/10/04) who feared for the safety of monkeys if they became socialised, stated that feeding stations "*socialises them to humans and I don't think that should be one of our priorities. I think the more weary a monkey is of humans the safer the monkey is.*" Fitchit (pers. comm., 10/11/04) reiterated the danger of feeding stations by explaining the danger from territorial fights around feeding stations in winter which resulted in many babies being killed. In addition, environmental imprinting occurs where a baby imprints on the wrong food type causing more harm in the long run.

Smit (pers. comm., 28/10/04) encouraged feeding stations only when its purpose was to draw the wildlife away from sensitive areas like schools and hospitals. He described the process "*The amount of food should not be sufficient to make the monkey dependent on that source. Once they are there, reduce the amount of food gradually so that dependency is less and less and once problem has decreased in the original area. Only if foraging is natural.*" But even Smit did not condone feeding under normal circumstances as it concentrated the problem and when the food source was removed monkeys moved into properties and houses in search of food to replace this source.

Senogles (pers. comm., 29/10/04) felt that no research had been done to ascertain the exact effect of feeding stations on the monkey problem.

(d) Education and Awareness

When posed the question of the effect of education and awareness on the monkey problem, for the first time respondents were in unanimous agreement over the positive effects. Smit (pers. comm., 28/10/04) thought that education was "*the single biggest thing that we can do for Vervet Monkeys,*" and Senogles (pers. comm., 29/10/04) agreed by stating "*I can prove it time and time again because I have given lectures and talks. Children learn from my slide talk and don't let their parents shoot them.*" Butler (pers. comm., 03/11/04) who also saw the merits of education and from his practical experience with urban residents explained "*as soon as you know how to deal with them and know what they're dealing with, problem decreases. Decreases ignorance and increases tolerance.*"

Baker (pers. comm., 17/11/04) agreed with the merits of education but lamented that there were not nearly enough education articles in the paper. He felt that educational efforts should be stepped up but highlighted the problem with the lack of resources to do this. The need for partnerships with wildlife societies, bird clubs and educational institutions to spread education was therefore evident. Brigg (pers. comm., 17/11/04) and Cottrell (pers. comm., 07/03/05) felt that at the very least, education could help to dispel common myths about issues like rabies and promote a better understanding.

Thompson (pers. comm., 27/10/04) and Thusi (pers. comm., 09/11/04) both felt that education was a long term solution which needed to be cultivated from childhood, as an appreciation for other living beings, to be effective.

(e) Religion and Spirituality

In contrast to the previous question, interviewees were divided over the effect of religion and spirituality on the monkey problem. A total of four respondents thought there would be a positive effect of religion and spirituality on people's perceptions of monkeys, while the same number disagreed and the remaining two were unsure. Of those that saw the beneficial side of religion and spirituality, they expected the effect to be that people were more sympathetic and had a stronger awareness of the place for nature on this earth if they were religious or spiritual. Brigg (pers. comm., 17/11/04) agreed by stating that "*anyone with strong convictions will realise we share this earth with wildlife and nature and why should we be essentially superior. There's more sympathy from people with strong religious and spiritual awareness.*"

Other respondents thought that culture played more of a role than religion. Butler (pers. comm., 03/11/04), Smit (pers. comm., 28/10/04), Thompson (pers. comm., 27/10/04) and Baker (pers. comm., 17/11/04) saw the cultural perspective, as from their experience different races react differently to the problem. Thompson and Baker felt that Indians and Africans were less comfortable around nature as they reacted more hysterically to the monkeys and preferred manicured gardens to natural indigenous gardens. Some Africans also ate monkeys.

Smit and Butler highlighted the affiliation of some cultures, like Indians to monkeys, but both agreed that cultural influence was very slight. Senogles (pers. comm., 29/10/04) thought that more than religion having an effect, it was what she terms "*religiosity*" which she felt was an awareness.

Armstrong (pers. comm., 01/11/04) and Fitchit (pers. comm., 10/11/04) both felt that religion and spirituality had no affect as a person was more influenced by their up bringing and opinions as an individual.

(f) Proximity to Open Space

Interviewees were finally asked whether living in close proximity to an open space or within a conservancy had any influence on a persons perception of monkeys and the monkey problem. Again reactions were divided, as four respondents agreed that it did while four disagreed, one was unsure and one did not offer a response.

Those that felt that living in close proximity to a reserve or within a conservancy did influence perceptions offered the explanation that people who lived in these areas became more tolerant of nature. Smit (pers. comm., 28/10/04) felt that people had "*greater appreciation for nature when you see it in action. There are also psychological positives.*" Butler (pers. comm., 03/11/04) also felt that "*people are aware that they live close to an open space and are more tolerant. The nearer to a reserve, the less militant.*"

Brigg (pers. comm., 01/02/05) and Senogles (pers. comm., 29/11/04) felt that people bought houses near an open space because they already appreciated nature and wanted to be closer to it, but there were exceptions. Thusi (pers. comm., 09/11/04) agreed with this but felt that sometimes a cheap house or another factor could have influenced people with very little appreciation for nature to live there, but it was hoped that "*with time they might come to realise what nature is all about and then they will begin to flow with the beauty of nature and respect nature – even in rural areas.*"

On the contrary, Thompson (pers. comm., 27/10/04) and Baker (pers. comm., 17/11/04) felt that upbringing was still the most important factor influencing ones perception.

6.3.4. Who Is Responsible?

One of the major problems with the management of monkeys in an urban area was the lack of proper governance or the lack of designated responsibility for urban wildlife. Interviewees were therefore questioned about the responsibility of Vervet Monkeys in an urban area and who should be held accountable for their welfare. Interviewees indicated more than one response to this question. "Local government" contributed to thirty nine percent of the total followed by the "municipality" at twenty eight percent. Other categories mentioned were "everyone" and "me" which were favoured by seventeen and eleven percent respectively, and "environmental associations" which contributed to six percent of the total. Overall, respondents were very divided over their choices and had no clear indication of who the actual custodians were of these monkeys or who should be.

Senogles (pers. comm., 29/10/04) thought that everyone should be held responsible as authorities were unable to manage urban wildlife and states that "*the municipality are a dead loss.* [There are] *a few people but I can mention them on the fingers of one hand. Few and far between. They say that they are busy, but they are not busy they are too lazy.*" Fitchit (pers. comm., 10/11/04) thought that KZN Wildlife should be responsible as "*they are public employees and mandated by the public to be custodians of wildlife. They need to take responsibility for these animals. We are just mandated to rehabilitate. They have ignored the problem. They are not geared to deal with this problem.*"

Ironically, when asked of KZN Wildlife who should be responsible Thusi (pers. comm., 09/11/04) thought that in addition to the municipality and local government, D'MOSS and City Engineers should also take some responsibility. He also indicated that they should be more co-operation between their department, non – governmental organisations and CROW.

Butler (pers. comm., 03/11/04) felt that the onus was "now" on local government and should belong to local government. For rural areas it was KZN Wildlife. Armstrong (pers. comm., 01/11/04) was less scathing than Senogles and Fitchit but negative nevertheless about the government stating that "*if the government is prepared to allow densities to increase, they are getting more money out of it. The rates increase.*" She was referring to the increase in land density and decrease in open space in Westville indicating that this change was motivated by the income from sub division and other land changes.

Baker (pers. comm., 17/11/04) felt that the responsibility did lie with local government but for the preservation of habitat rather than direct protection of the animal. Brigg (pers. comm., 01/02/05) agreed that local government should be responsible but also indicated success with an "*aggressive education approach*" initiated by their own environmental officer.

6.3.5. Potential Solutions

Interviewees were finally asked, in view of the unchecked rate of urbanisation, what solutions they would propose to the problem. Here respondents offered more than one answer. Education was favoured by most respondents especially as a means of debunking myths about monkeys. Senogles (pers. comm., 29/10/04) felt that "*we can't educate fast enough. People complain about monkeys eating the birds. But we are allowed to cage birds and feed them nonsense and that's socially acceptable.*" Butler (pers. comm., 03/11/04) also explained the value of education to dispel myths, by explaining aspects like troop dynamics to people and explaining why relocation can not work due to the intricacies of troop dynamics. Fitchit (pers. comm., 10/11/04) thought that "*education would help stop mass hysteria*," while Brigg (pers. comm., 01/02/05) felt that education should make clear to people that "*if they behave in a certain way, the monkeys will behave in a certain way. They will always be a nuisance when they enter people's homes, but if they get the fruit before I do it's not a life and death situation.*" Cottrell also advocated education by explaining "*education and awareness is essential in order to break down perceived notions of the problem.*"

The second most popular potential solution noted was the preservation of open space and stricter restrictions on development. Thompson (pers. comm., 27/10/04) felt that "*the D'MOSS system is very important. The open corridors and maintenance of indigenous open corridors and green belts and far stricter development.*" Baker (pers. comm., 17/11/04) offered a few practical solutions namely "*we need current, on the ground implementation of protecting what we have, open spaces. Future: we need strategic planning and partnering with institutions that are custodians to the environment to go forward sustainably.*" Smit (pers. comm., 29/10/04) added to these suggestions by advising that "*vast tracks of land that are spoilt can be used as open spaces. Need a hierarchy of vegetation with ecosystems and communities. Need a respect for animals and need to address the basic problem before looking at relocation.*" Like Baker, Thusi (pers. comm., 09/11/04) also saw the need for partnerships in addition to good laws and good enforcement. But also highlighted the need for understanding the balance required between people's needs and the environment. Fitchit (pers. comm., 10/11/04) too highlighted the need for open space preservation and indigenous vegetation, but advocated good corridor systems along gardens and boundaries, not near roads.

The need for stricter laws for wildlife was also emphasised by interviewees. Senogles (pers. comm., 29/10/04) highlighted the need for property laws that stipulate "*if you move on to this property, you are not allowed to shoot monkeys.*" Thusi (pers. comm., 09/11/04) and Fitchit (pers. comm., 10/11/04) also supported stricter legislation but where Thusi was vague about the type of laws, Fitchit explained that immediate protection was needed for all wildlife from KZN Wildlife and the law. And there was a desperate need for the modification of the Conservation and Agricultural Resources Act (CARA) to have the term "vermin" removed as "*there is no place for Vermin in the 21st century,*" The status of monkeys on the CITES appendix also needed to be upgraded. And most importantly, stricter laws were required to prosecute people who harmed wildlife and Vervet Monkeys.

Sterilisation and contraceptives were thought to be a short term solution by Armstrong (pers. comm., 01/11/04) and Fitchit (pers. comm., 10/11/04).

Fitchit explained that to buy some time, contraceptives would be a short term solution to the problem and so would translocation of only endangered troops in highly built up areas. But she stressed that this solution should be only temporary as it would eventually affect the numbers of the Vervet Monkey population. And three respondents felt that modifications to homes and gardens would be beneficial as a quick solution to the problem for urban residents, as will prohibitions to feeding stations in an urban area.

Most respondents identified the need for greater awareness and tolerance from residents towards monkeys and wildlife in general. Butler (pers. comm., 03/11/04) campaigned for greater awareness and tolerance and explained that when you encountered problems there were specific ways to deal with different problems and these could be fairly simple methods, but people needed to be more understanding and tolerant and willing to make small, simple changes to alleviate the problem.

Finally, Fitchit (pers. comm., 10/11/04) emphasised the need for a holistic solution to the problem as opposed to short term ecocentric solutions like relocation. She depicted a scenario where "*monkeys are given respect and not considered vermin. Their uses and the need for them should be highlighted.*"

While the interviews asked similar questions to the questionnaires administered to residents, the responses were rich and more detailed offering in-depth explanations to the nature of the monkey problem and the behaviour of the monkeys and humans. Interesting insight was gained into the common perceptions held by people and how their behaviour towards wildlife was affected by this. The following section, the first of the secondary data, assesses the change in the land use structure of Westville using orthographic photographs.

6.4. Land Use Change Assessment

By digitising three sets of orthographic photographs between the years 1974 and 2000, changes in land use and open space provision in the Westville area were determined.

Using ArcView GIS and a procedure detailed in the previous chapter, the change in area of forest and woody areas, natural grassland areas and recreational areas was calculated. An assessment of orthographic photography of the Westville area showed distinct changes in open space provision between the years 1974 and 2000. Figure 6.10 showed a decrease in total open space provision from approximately forty percent of the total area of Westville in 1974 to twenty nine percent in 1985 and just over twenty four percent by 2000, an overall drop of just over fifteen percent over the twenty six year period.

The forest and woody area as well as the natural grassland area were just under nineteen percent of the total area in 1974. The provision of forest and woody area dropped to seventeen percent in 1985 and under ten percent in 2000. Natural grassland also decreased to twelve percent in 1985 but recovered slightly in 2000 increasing to thirteen percent. Recreational areas remained fairly consistent over the researched period. Changes were only reflected in decimal places, with provision in 1974 at 1.8 percent, 1.1 percent in 1985 and a slight increase to 1.7 percent in 2000.

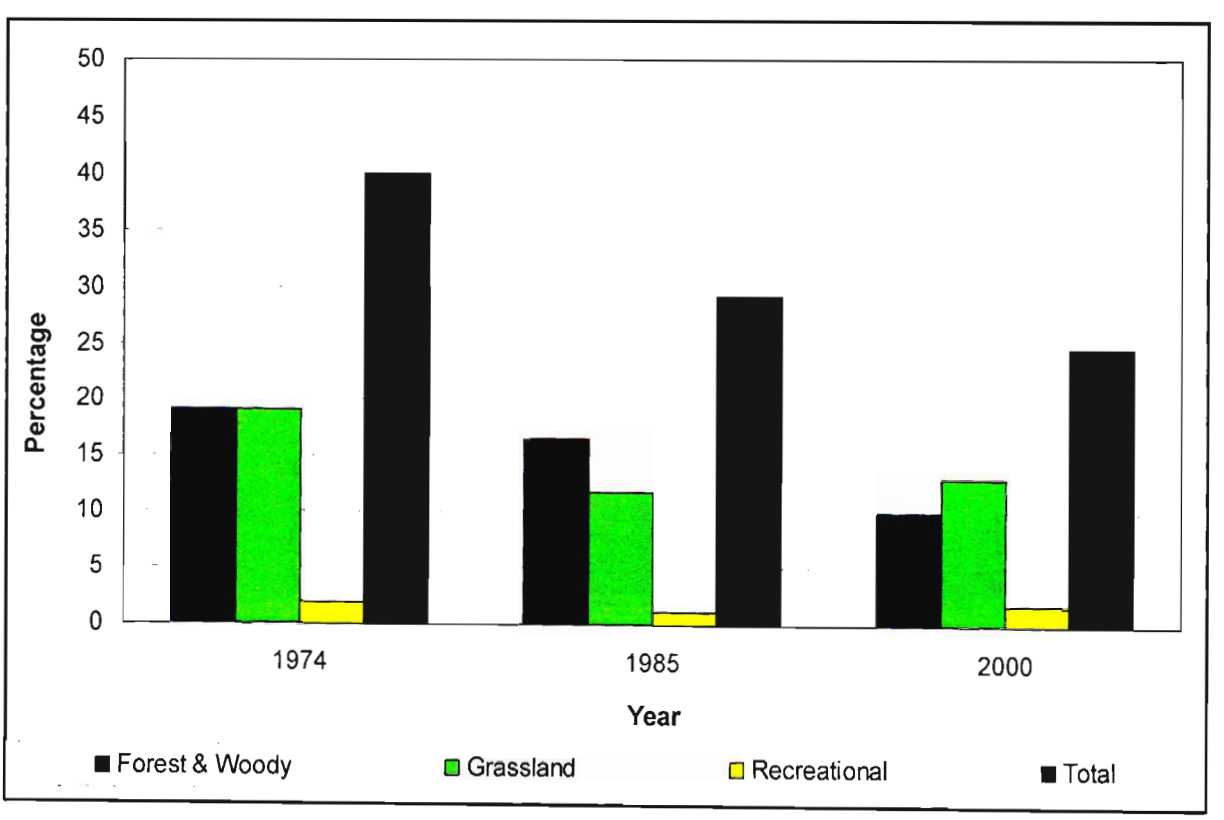

Figure 6.10: Change in Open Space Provision in Westville (1974 – 2000)

Significantly, the number of and the area of the grassland habitat "pockets" (individual open spaces) had reduced over the studied period. The distribution of grassland areas interpreted from the statistics of the "area field" of the attribute table in ArcGIS illustrated this. The total number of pockets of grassland had reduced from 116 in 1974 to 84 in 2000 (see Table 6.4). Of this land, a considerable amount were preserved in large pockets in 1974, the smallest pocket of land being 1 537m^2. While the majority of the grassland pockets fell within the 15 000m^2 and 20 000m^2 categories, there were a fairly large number that covered larger areas such as between 40 000 m^2 and 60 000m^2 as well as between 200 000m^2 and 300 000m^2 (see Figure 6.11). Figures 6.11 and 6.12, show area on the x axis represented as the maximum for each category (i.e. 10 000 m^2 represents 5001m^2 to 10 000m^2) as the graphs were too small to show full labels.

A change in this scenario was noted in the frequency distribution of natural grassland in 2000. The smallest pocket of land was only about 311m^2 and the majority of the grassland pockets remaining in this year fell between the 5000m^2 and 10 000m^2 categories. Sizable patches only went as far as 35 000m^2 with slight peaks at 80 000m^2 and 200 000m^2 (see Figure 6.12). While the maximum area in 2000 was greater than the maximum area of 1974, this could be due to the provision of grassland reserves which will show up as a few large pockets of land and many small pockets as opposed to an even distribution of medium to large grassland pockets as was the case in 1974. This is confirmed by the standard deviation value for each year which is much higher for 2000 meaning that the area values in that year deviate more from the average value than they do in 1974. The average area is also marginally higher in 1974 (see Table 6.4).

Table 6.4: Statistics of Area of Natural Grassland for 1974 and 2000

STATISTICS	1974	2000
Count	116	84
Minimum (m^2)	1537	311
Maximum (m^2)	348957	653100
Sum (m^2)	3995885	2719245
Mean (m^2)	34447	32372
Standard Deviation	55025	83163

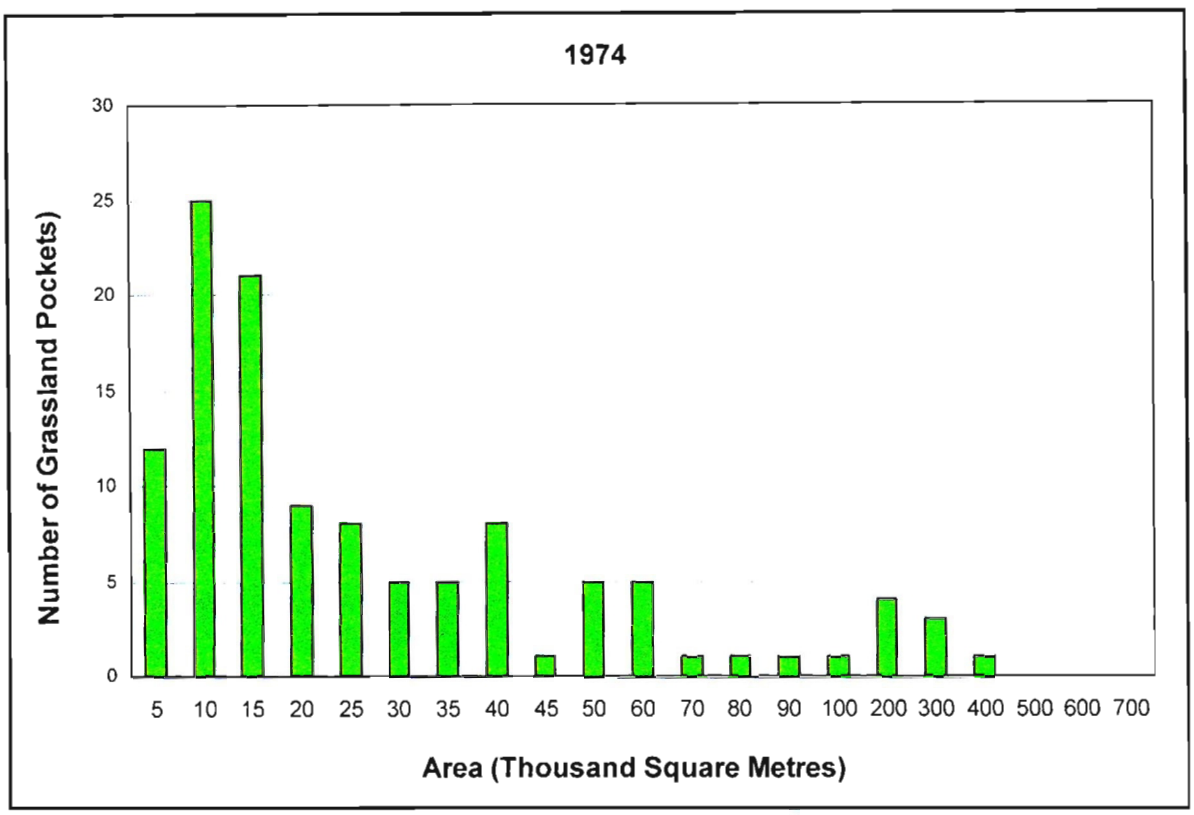

Figure 6.11: Area Distribution of Natural Grassland (1974)

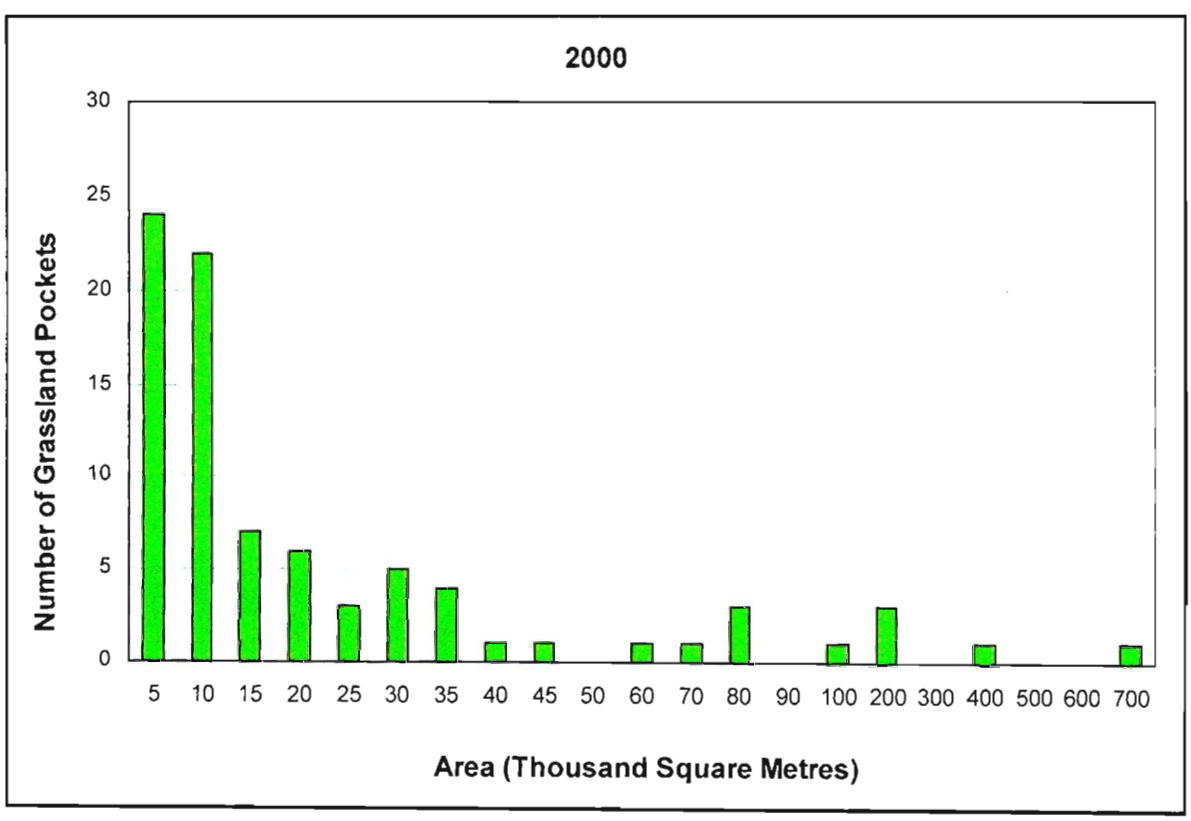

Figure 6.12: Area Distribution of Natural Grassland (2000)

Although the interpretation of the photos during digitising was flawed due to the poor quality of scanned images, the overall picture clearly showed a steady decline in total open space provision. Recreational provision changed slightly while natural grassland and forest and woody provision had decreased considerably. In addition, the size of the remaining pockets of grassland had reduced. The role of the local media in the monkey discourse is interrogated in the following section.

6.5. Newspaper Articles and Letters to the Editor

The role of the press in influencing wide scale perceptions is immense, as described in chapter two of this dissertation. The role of the media in the monkey discourse was assessed by examining articles in the local newspaper of the Inner West region, the *Highway Mail* from 1960 to 2004. Changing public perception was also assessed by scrutinising letters written to the editor of the newspaper from 1985 to 2004.

An assessment of the articles and letters to the editor dealing with Vervet Monkeys in the Highway Mail from 1960 to 2004 provided very erratic results (see Figure 6.13). The number of articles written was between one and two for each five year period from 1960 to 1984 but then saw an increase for the next fifteen years to approximately four articles per five year period, with a high of five articles between 1995 and 1999. This number again decreased to two between 2000 and 2004.

The nature of the articles changed significantly over this time period. For the first two decades articles dealing with monkeys were exclusively negative and described monkeys as nuisances and threats (see Table 6.5). The majority of the articles reported in negative light stressed how problematic the monkeys were and called for their relocation and sometimes culling as a solution. Reporting changed over the next one and a half decades where positive articles equalled the negative reporting and neutral reporting was at a high. This structure again changed in the decades following up to 2004, where neutral and positive reporting became the focus and negative reporting disappeared. Positive reporting focused on the problem of human intolerance and a lack of understanding (see Table 6.6).

These articles also emphasised the threat of humans to monkeys and called for more compassion for the animals. Neutral articles were mostly informative on the monkey's behaviour and listed both the positives and negatives of having the animals in an urban area.

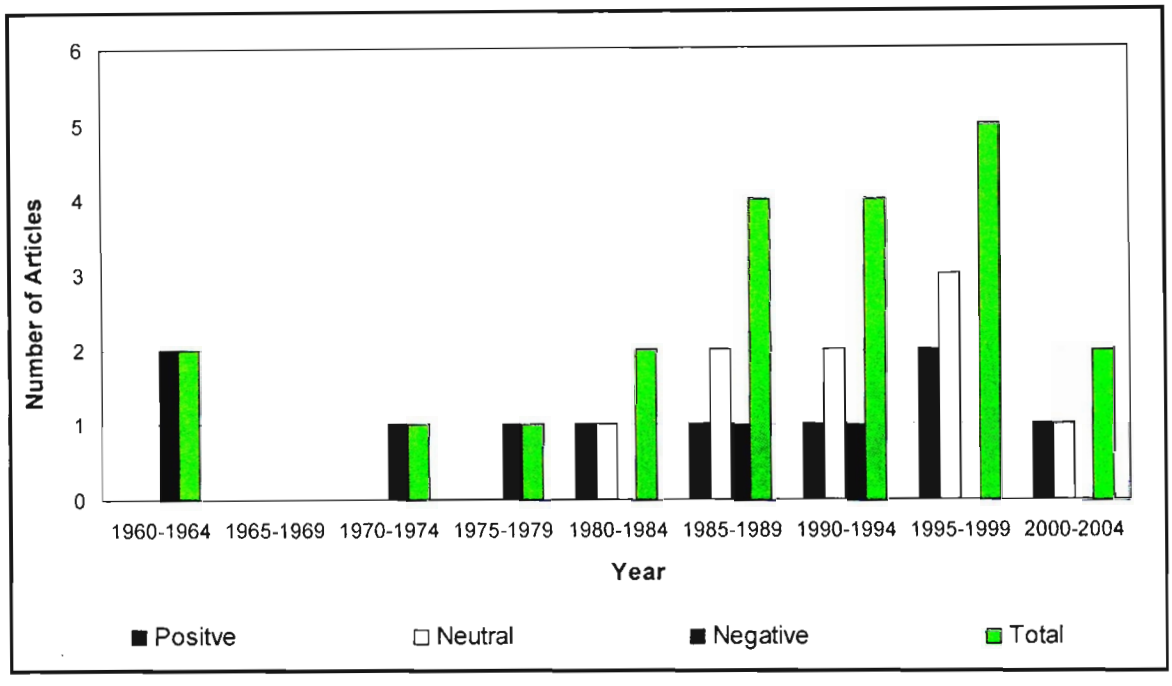

Figure 6.13: Number and Nature of Articles in Highway Mail Dealing with Monkey the Problem

The number of articles written per month between 1960 and 2004 were also erratic and showed no distinct patterns. With the exception of January, April, July and November, other months have recorded between one and three articles during this period. January, April and November have had no reports written at all and July recorded the highest number of articles, seven.

The "letter to the editor" section was initiated in the mid eighties so the data was more recent. The letters on problem monkeys rose steadily from 1985 culminating in a high of ten letters for the 1995 to 1999 period, the same "high" period as the articles section (see Figure 6.14). The number then dropped to five letters between 2000 and 2004. The period 1985 to 1999 contained more positive than negative letters and no neutral letters. This ratio was equal, however, for the 2000 to 2004 period, with a steady increase in negative letters.

The positive letters were mostly from residents expressing their love for the animals in Westville and were approving of the animals in and around their property. The negative letters however, highlighted incidents were gardens or home were "destroyed" and animals and children threatened.

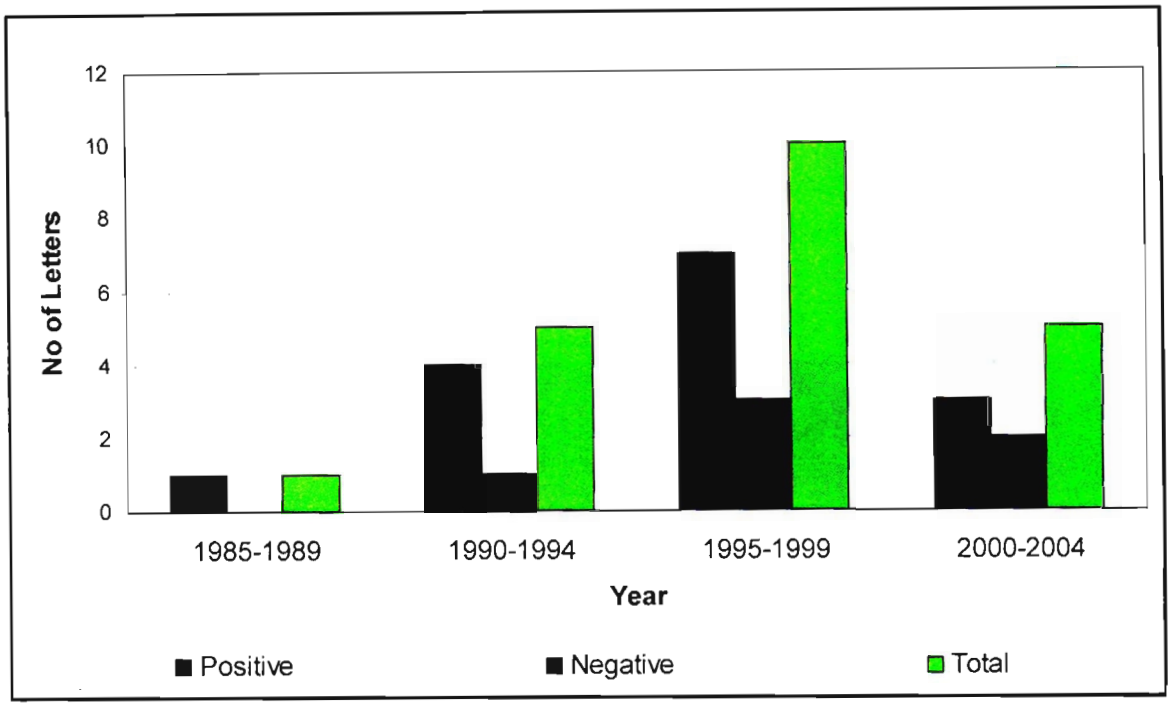

Figure 6.14: Number and Nature of Letters to the Editor in Highway Mail Dealing with Monkey the Problem

An analysis of the number of letters written per month showed no distinct patterns. the number of letters averaged at one from June to September and January. This increases to two between March, November and December and then increased to three in May and October. April reported no letters, while February recorded a high of four letters.

Although no significant trends in media reporting were identified, interesting was the changing nature of reporting, over the period in question. The shifting viewpoints of both the reporters and the public reflected the thinking around the monkey debate at the time. Interestingly, a peak in the number of articles coincided with the peak in the number of letters to the editor, between 1995 and 1999 and despite shift from negative to positive articles over time, there was an increase in number of negative letters over the this period (see Table 6.5).

Table 6.5: Some Words of Phrases used in Articles concerning Monkeys in the *Highway Mail*

NEGATIVE	NEUTRAL	POSITIVE
Nuisance	Educate children	No more devious than humans
Destructive	Feeding problems	Attacks rare
Long canine Teeth	Increase in complaints	Victims
Extremely dangerous	Not problem animals but a nuisance	Helpless
Diseased	Do not feed	Unable to fend for themselves
Trouble	Young	Population not about to explode
Aggressive	Injured	Sympathetic
Out of control	Orphaned	Innocent
Scare children	Natural feeding habits	Attack dogs in defense
Starting to become human	Monkey business	Culling not an answer
King Kong	Species	Pellets fired by people for amusement for obliteration
Bolder	Creatures	Intolerance
Must be approached with caution		Think they are proving their manhood
Destroying everything in their paths		Lack understanding of nature
Stripping trees in the process		Guns to resolve problems
Turning the indigenous wonderland in to a vegetable garden		Enchanting & entertaining
Virtually impossible to control		Playful & joyful
A fine line between life conservation and the nuisance caused by marauding monkeys		Deprived

6.6. Records from CROW

When injured animals were brought into the Centre for the Rehabilitation of Wildlife (CROW) the person admitting the injured animals was required to fill out a detailed admission form, the details of which are discussed in the previous chapter. These records were not filed meticulously by CROW and as a result there were many records missing prior to 1998 and some were misplaced altogether. The records that were available, however, proved invaluable in ascertaining figures on the number of injured monkeys per month and per annum on average, as well as the nature of their injuries.

Records from CROW were analysed statistically to show important patterns and obtain a profile of injured monkeys and the nature of their injuries. The majority of injured monkeys, seventy five percent, were male and fifty eight percent were juveniles. Adult monkeys were also at high risk, with thirty three percent of injured monkeys falling into this category. Only eight percent of injured monkeys were babies.

All injuries occurred either in the morning, forty two percent, or afternoon, thirty three percent. None of the injuries occurred in the evening or at night. Records of injured animals were only stored as far back as 1998. Since then the majority of injuries occurred in 2004, with fifty percent of the injuries coming from that year. The years 2001 and 2002 each recorded seventeen percent of the injuries and 1999 and 2003 recorded eight percent. The years 1998 and 2000 had no recorded injuries to Vervet Monkeys.

A summary of the number of injuries per month showed a fairly constant picture, though an increase in injuries between April and July illustrated by the red block in Figure 6.14. January, February, July and December all recorded eight percent of the injuries, while March and August to November recorded zero injuries (see Figure 6.15).

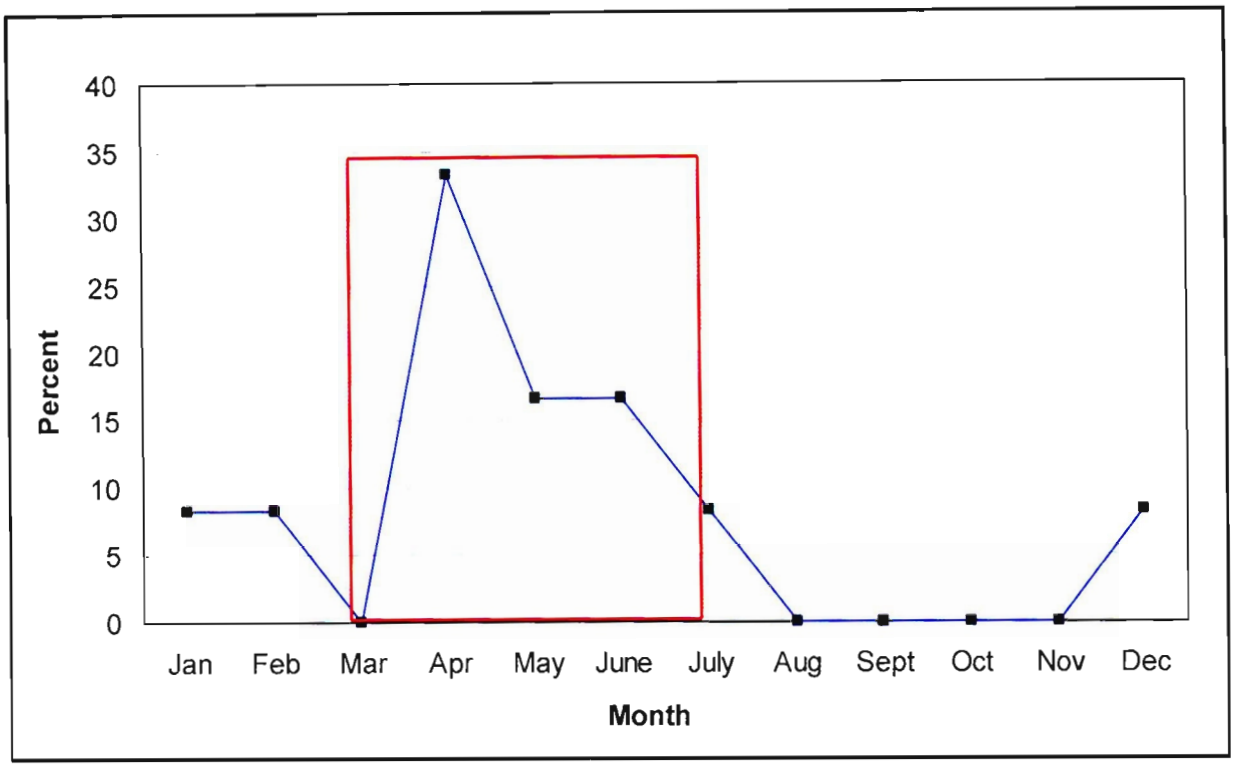

Figure 6.15: Number of Monkey Complaints per Month (1988 – 2004)

When filling in the admission for, at CROW, finders were asked to give their details of the injury to the admitted animal. Upon examination, the doctor on call would then specify the actual nature of the injury. Records showed large discrepancies between the "finders" cause of injury compared with the doctor's. Figure 6.16 illustrates that the main cause of injury detailed by finder's was "knocked by car" and "caught by hazard or trap." Other reasons were mentioned all in an equal percentages of eight.

The doctor's reports show however, that neither of the main causes of injury specified by the finder's reports were correct and that the majority of injuries, thirty three percent, were caused by shooting or assault, followed by a non-specified "sick or ill" which constituted seventeen percent. Again, the other reasons held an equal eight percent of the injuries, while the reasons "no food and water" and "disorientation" that stood at eight percent under the finder's reasons, were zero in the doctor's report section.

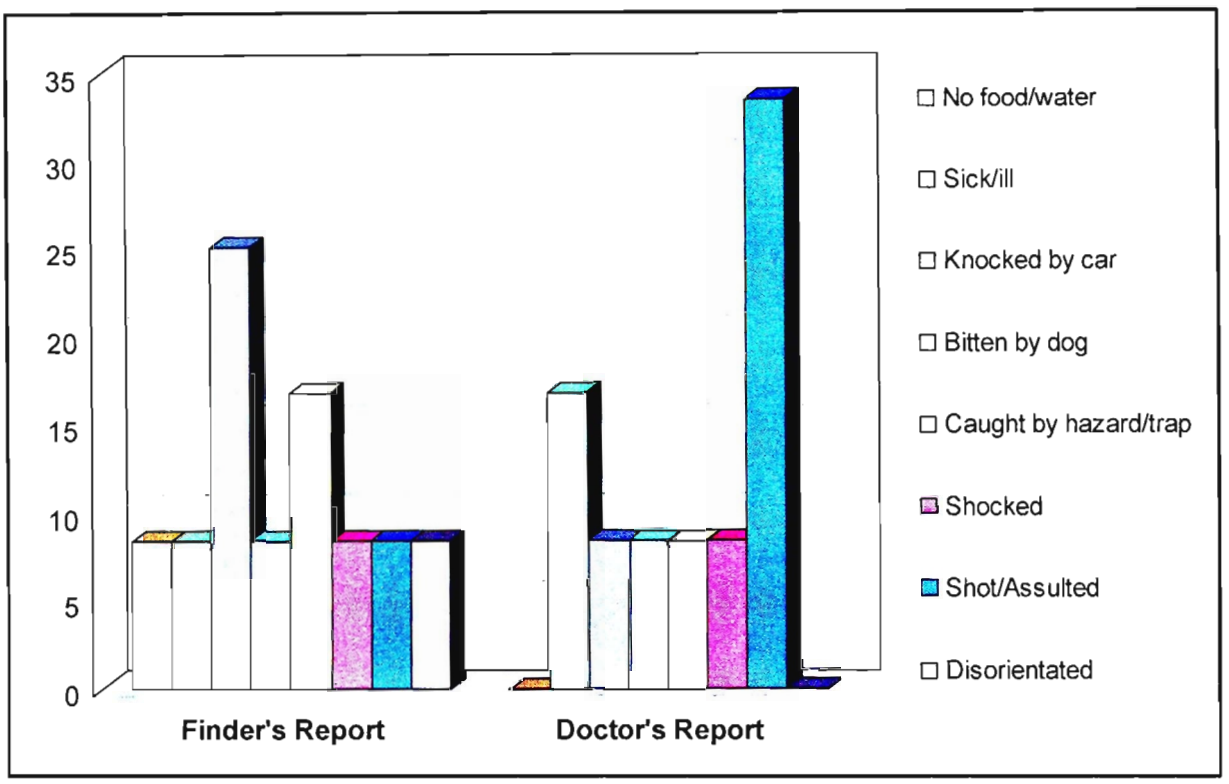

Figure 6.16: Cause of Injury Furnished Before and After Doctor's Diagnosis

The results from CROW records show, significantly, the time of year that monkeys are most vulnerable as well as the nature of the injuries as diagnosed by a doctor. These results will realistically prove valuable in verifying claims from both residents and interviewees that the problem is increased in winter, and that humans are a threat to monkeys, as illustrated by the nature and extent of their injuries.

6.7. Correlations

Using the demographic and site survey data from the questionnaires, various variables were compared with figures of "perception of the monkey problem" and figures of the "actual problem" for potential correlations. The figures of the "perceived problem" field were calculated by assigning a rank between one and five to each respondent, based on their description of the problem, with "one" being assigned to respondents who did not feel there was a problem and five being assigned to respondents who experienced feelings of fear and conflict towards monkeys.

The figures of the "actual problem" field were calculated by averaging the ranking (coded previously) of the responses to two questions; the frequency at which monkeys visited the respondents properties and the number of monkeys in the troop. Once this average was calculated, a ranking of "one" showed a high actual problem with frequent visits by numerous monkeys, while five indicated a low actual problem with infrequent visits and few monkeys. Once these rankings were assigned various correlations and an average were calculated to assess if any relationships between certain variables existed. The graph of the average calculation depicted on figure below may seem to have a small scale on the "y" axis, but is because the ranking system only ranged from one to five and differences in fractions or decimal figures were still significant. And while this method is still subjective, using human perception as an indicator, it is the best that can be done without a more extensive study on the monkeys themselves involving monitoring over a period of time.

Table 6.6 shows the relationship between the perceived problem and demographic data and the actual problem and site survey data. The table shows that no significant correlations exist between any of the variables tested. Age had no influence on a person's perception of the monkey problem and surprisingly, neither did an individual belonging to an environmental association or group. When the perception rankings for people belonging to environmental associations and those that did not were averaged, however, the people who did belong to associations or groups averaged a figure of 1.90 while those who did not averaged a figure of two. This shows that the perception of the problem is marginally less serious for the former group.

The size of a respondents garden had no bearing on the frequency and number of monkeys visiting a property and neither did the presence of fruit trees in the garden or the presence of alien invasives. A calculation of the average of the actual problem in relation to the percentage of alien invasives in the respondents gardens showed a slightly lower actual problem with increased alien invasion. This indicates a slight preference by monkeys for indigenous gardens. Interestingly, no correlation was found between the actual problem of monkeys and distance away from the Palmiet and Roosfontein Nature Reserves (see Figure 6.17).

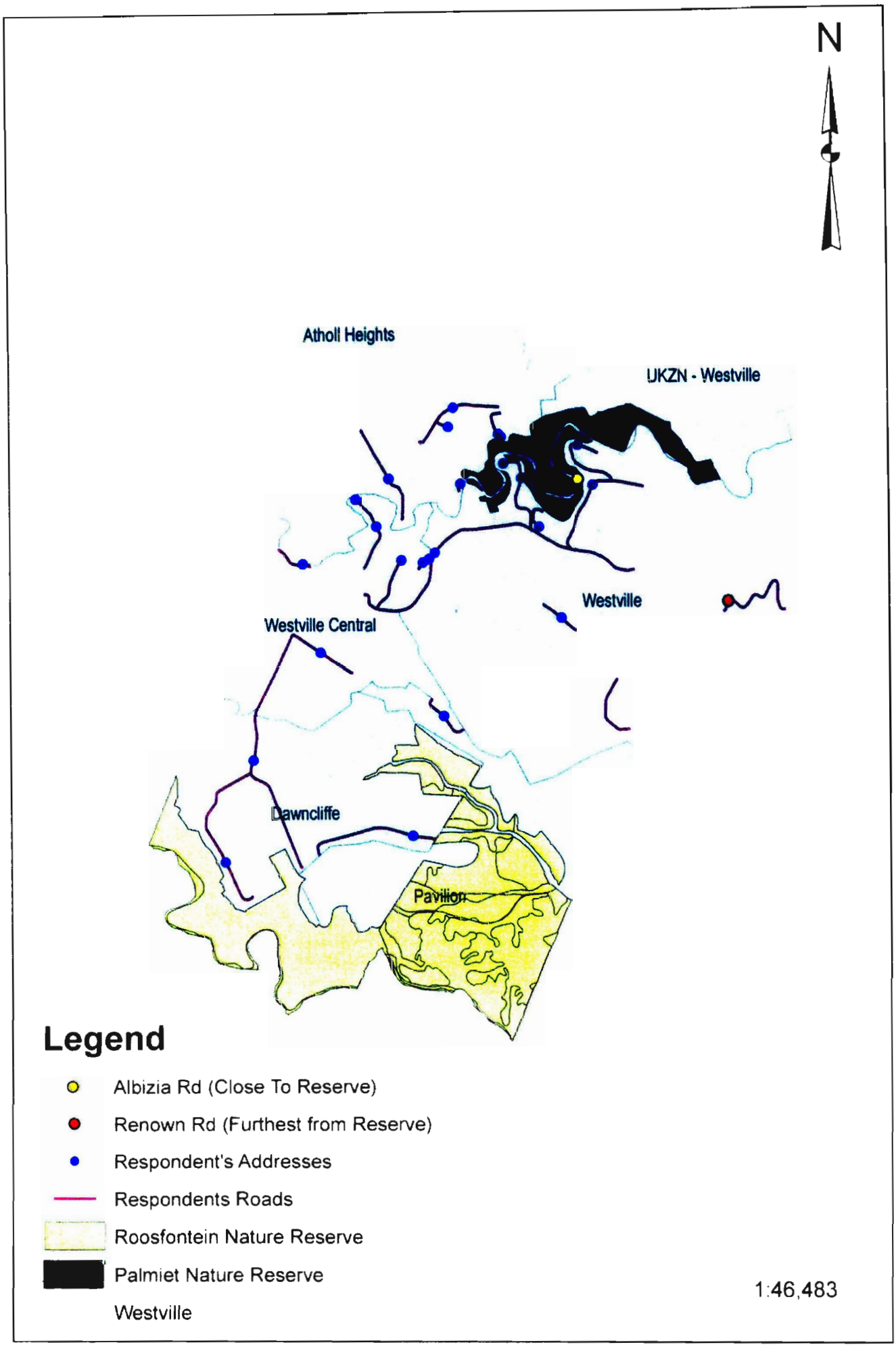

Figure 6.16: Location of Respondents in Relation to Westville Open Spaces

This correlation calculation was carried out by locating the addresses of respondents on a GIS map using location functions from the orthographic maps on the eThekwini website. Buffers were placed around the two nature reserves of varying distances from fifty meters to 1500 meters. The properties that fell within the first buffer were assigned a ranking of one and the properties that fell within the last buffer were assigned a ranking of five with increasing distance.

It was found that even the single property in the last buffer, 1500 meters away from the Palmiet Reserve, had fairly frequent visits by monkeys in large numbers (see Figure 6.17: Renown Road), while the properties in very close proximity to the reserve showed similar patterns of monkeys visits (see for example Figure 6.17: Albizia Road).

Table 6.6: Correlations for Different Demographic and Site Survey Variables

VARIABLES	CORRELATION VALUE	RESULT
Perceived Problem		
Age	-0.21	No correlation
Member of Environmental Association	0.01	No correlation
Actual Problem		
Size of Garden	0.21	No correlation
Presence of Fruit Trees	0.17	No correlation
Alien Invasion	0.06	No correlation
Distance from Palmiet or Roosfontein Reserve	0.12	No correlation

The rankings assigned to the perception of the problem were then compared with level of education and gender of respondents. The rankings of "perceived problem" were grouped together based on which "level of education" or "gender" category they fell under (i.e. post graduate or female) and then averaged. Gender was found to have no significant pattern, with figures between males and females both averaging at 1.7. It was found, that although fairly close, there was a decrease in the perceived problem with an increase in the level of education from senior secondary to post graduate study (see Figure 6.18).

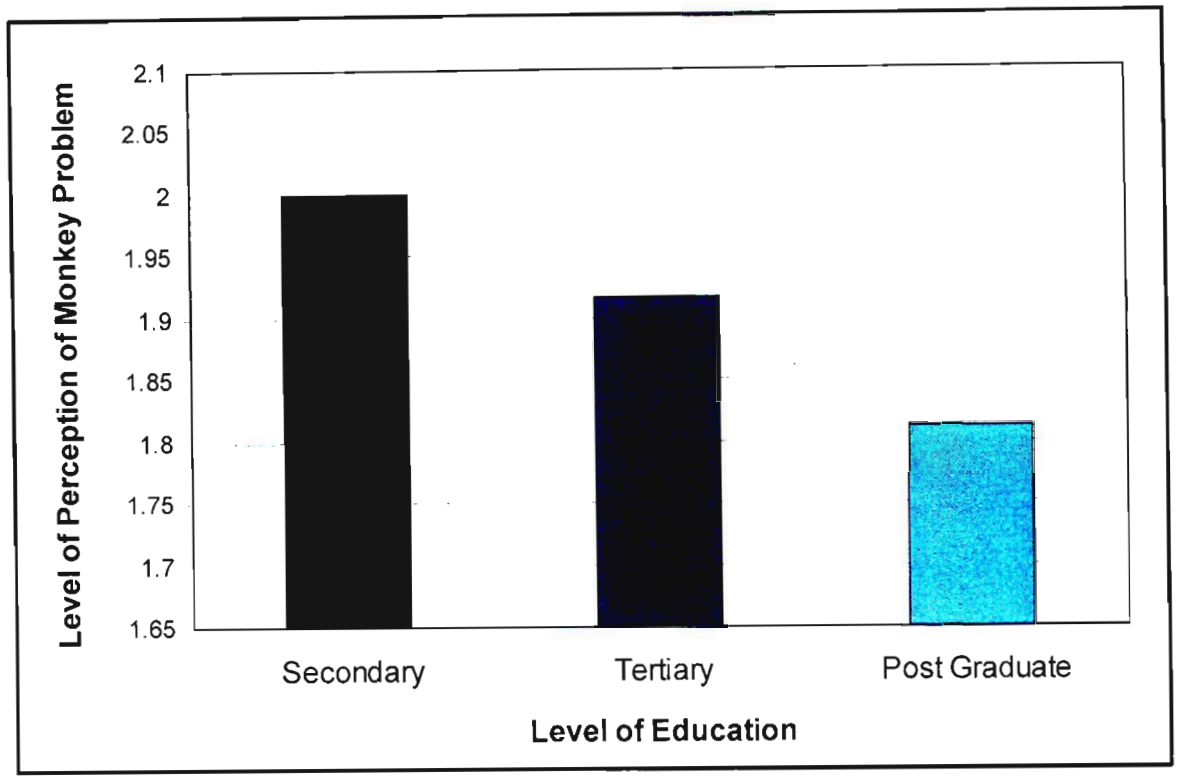

Figure 6.18: Differences in Perception of Monkey Problem in Relation to Education Level

Correlations calculations indicated that no relationship existed between many demographic variables, like age and distance from open space. There was, however, a slight decrease in respondent's perception of the problem with a higher education level. This illustrated the mostly erratic behaviour of both humans and monkeys in their interactions.

6.8. Conclusion

This results chapter presents the analysed finding of a lengthy data collection process, consisting of primary data in the form of questionnaires and interviews. The results of secondary data analysis was also presented which included a land use change assessment using orthographic photography, articles and letters to the editor of the *Highway Mail* and records of injured monkeys from CROW. Finally, correlation calculations were performed to assess the relationship, if any, between various demographic and site survey variables. The following chapter seeks to explain the meaning of these results and its implication for the management of Vervet Monkeys.

CHAPTER SEVEN
DISCUSSION

7.1. Introduction

The need for a discussion chapter separate to the results chapter was evident from the length of the results chapter. In addition, the results chapter was presented in a disconnected form according to the separate data collection methods. This discussion chapter seeks to tie up these results and present them in an integrated form. It is hoped that by doing this clear patterns will be formed and from this, informed recommendations can be formulated. This chapter presents the discussion under a few significant headings within which all results pertaining to that line of discussion from the various data collection methods are considered.

7.2. The Nature of the Problem with Vervet Monkeys

Complaints on the nature of the problem with Vervet Monkeys, as listed by residents, interviewees and media reports, showed essentially that the problem was more perceived than real as the majority were related to the *nuisance* factor of monkeys. By separating the complaints relating to the actual significant threat of monkeys from the list, there were a total of four complaints specified, including fear, running across roads, conflict with children and conflict with pets. These problems are not easily solved and require long term holistic solutions. While the problem of conflict with pets and children and fear can be alleviated with education, the problem of monkeys running across the road can only be lessened if the monkeys have other, less dangerous routes to utilise to reach their desired destination. In an urban area, the only way to provide these paths to monkeys is by setting aside land for the establishment of well developed corridors, using rigorous ecological principles. Complaints such as the theft of food, intrusion into homes, acting as a pest or nuisance and noise are superficial problems that can be solved through simple modifications, as explained by Butler (pers. comm., 03/11/04).

These include methods such the concealment of edibles, refraining from feeding monkeys, adhering to guidelines circulated by authorities and calling for assistance when needed. The view that the threat of monkeys is more perceived than real was reinforced by the opinion of the majority of interviewees and questionnaire respondents who felt that monkeys were not a threat to humans. In addition, studied media reports and letters to editor from the *Highway Mail* showed most complaints from residents to be superficial relating to the nuisance factor of monkeys. The combination of these findings shows that despite the hysteria over the presence of monkeys in the area of Westville, the problem was related more to superficial complaints and a lack of understanding of the characteristics and behaviour of monkeys. Practical solutions could be employed for easing the problems of intrusion, mess and theft of food in kitchens. As explained above, approaches such as hiding edibles from view and well stocked reserves and corridors could draw monkeys away from the residential areas, but would not solve the problem in its entirety. And these methods would still have to be communicated to residents by some form of knowledge dissemination, like education.

Those who perceived monkeys to be a threat again listed fears that were mostly unfounded and can again be solved with education which would help dispel myths associated with the behaviour of monkeys, the possibility of monkeys being rabies carriers, and inter – troop conflict. It could also teach tolerance with understanding. Fears for the safety of pets and children and threat from cornered monkeys or monkeys who themselves feel threatened, are not unfounded and were mentioned by the majority of articles and letters to the editor in the *Highway Mail* complaining about the presence of monkeys in an urban area. Support systems need to be put in place for residents to deal with monkeys who are cornered in a house and are hostile or "lone bulls" who are displaced and aggressive. While systems are in place for residents to call for assistance, they need to be aware that this option does exist and what action can be taken in the interim when in a threatening situation. If these options are made clear to them, some may think twice before reaching for a firearm or pellet gun.

Conversely, the majority of residents and interviewees thought that humans were of great threat to monkeys and these threats were also highlighted in two articles in the *Highway Mail* (Mellors, 1998; Murphy, 1999). Direct threats involving malicious injury by humans to monkeys and indirect threats including loss of habitat, future loss of habitat and containment, were mentioned. The view that humans are of great threat to monkeys was reinforced by results from CROW showing the main cause of injury to Vervets admitted to the rehabilitation centre, was shooting or assault. This issue of injury to monkeys by humans will not be easy to resolve as monitoring of wildlife in a residential area is impossible. To assist in reducing the threat, education to residents on respect for nature can again be used. Also, communication of these results that show unequivocally, that what is thought to be a threat to humans, monkeys running across the road, disorientation and aggression, often starts with an injury inflicted by a human. Perhaps a more visual campaign with pictures of injured, helpless monkeys as victims would draw sympathy from people and encourage them to be custodians to wildlife and persuade them to report people who are responsible for these grievances, even if it means blowing the whistle on a neighbour or friend.

In addition, stricter laws and governance are required on penalties for assault to wildlife, like trapping, poisoning and shooting with firearms and pellet guns. It is unacceptable that the charge of "discharging a firearm in public" is the only way in which wildlife authorities can prosecute a culprit who has killed or injured a monkey or any wildlife. Residents should also be encouraged to avoid the use of electric fences and barbed wire unless absolutely necessary, as they often injure monkeys and limit their space for movement through the area,

Habitat destruction is an indirect threat to monkeys discussed under the "land use change" section. The question of how often monkeys visited a resident's property was asked to gauge the frequency of actual monkey visits. Most residents had to deal with weekly or daily visits by monkeys. And the number of monkeys in these visits, recorded by the majority of residents ranged from eleven to twenty monkeys carrying mostly between one and five young. Results show that the movement of monkeys is mostly erratic and therefore these animals are difficult to manage.

A calculation done to assess the relationship between the distance from the Palmiet or Roosfontein Reserves and actual monkey problem showed no correlation. The residents away from the reserves still had frequent visits from a large number of monkeys. In addition, there was no correlation between the extent of the problem and the size of resident's gardens, the number of fruit trees in the yard or the extent of alien invasion in a garden. There was, however, a slight drop in the actual problem of monkeys in gardens with higher alien invasion. There are therefore no hard and fast solutions that can be offered to keep monkeys away from properties, but fruit trees might assist in keeping monkeys in gardens and along corridors and assist to "de-concentrate" the problem. It is also advisable to plant indigenous vegetation to maintain a natural balance in the surrounding environment as highly invaded gardens will ward off monkeys and the result will be a concentrated problem in healthy indigenous gardens.

Most interviewees and questionnaire respondents thought the problem with monkeys was consistent throughout the year but increased slightly in winter. When compared with results from CROW and the *Highway Mail*, results showed that the problem is probably consistent throughout the year but increased in winter. CROW records showed a distinct increase in the number of injuries between April and July, while articles in the *Highway Mail* show a high in July. The letters to the editor are fairly consistent throughout the year but increased in February. Knowing that the problem does worsen around winter time is somewhat advantageous, as it could allow wildlife managers and residents to be prepared for the inevitable escalation of monkey visits and all the subsequent consequences. Education could be stepped up in winter and reserves could be irrigated to promote growth of trees for sustenance+. By planting indigenous trees along corridors and reserves that provide sustenance for monkeys and bear in winter, the problem could be lessened in these times of limited resource supply. Baijnath (pers. comm., 01/12/05) a doctor of Botany, suggests that flora such as fig trees, strelitzia banana trees and wild palms could be cultivated, as well as some winter trees that flower or produce edible leaves.

7.3. Land Use Change and Associated Implications

The threat of habitat destruction and increasing urbanisation is evident not only from the responses from questionnaires and interviews, but also from the land use change assessment. Results confirmed that habitat for wildlife and monkeys, have indisputably decreased and continue to decrease, as seen from the general trend over the twenty six year period. But what affect, if any, does this change have on the problem of Vervet Monkeys? It is very difficult to assess the direct affect of development on Vervet Monkeys and make premature recommendations, especially with the gap between years of the land use change assessment so large. Without the formal monitoring of troop numbers is additionally difficult to gauge whether or not numbers have actually decreased.

Available information from monitoring by Jean Senogles (pers. comm., 29/10/04), however, has shown a decrease in troop numbers. It is therefore likely that the increased problem with Vervet Monkeys is in fact due to increased interaction between humans and people due to decreased space for the monkeys to inhabit. Mike Cottrell (pers. comm., 07/03/05) also recalled there being numerous Vervet Monkeys living in the Palmiet Reserve when he was younger but never interacted with them because of the abundance of habitat. It is also likely that an increase in inter – troop conflict has resulted from the lack of space which has led to a perceived increase in monkey numbers. Education on the technicalities of inter – troop conflict is therefore important. CROW records also show a much higher injury rate for males compared to females, which could be related to inter – troop fighting and the vulnerability of males that have been ousted from their troop.

The patches of land that remain are fairly small and unlinked and while monkeys are more mobile than other wildlife and posses the ability to scale barriers, it does involve crossing roads, making monkeys more vulnerable. An extensive review of the effects of habitat destruction and fragmentation in chapter two of this dissertation lists the numerous associated effects on indigenous fauna. In addition to a breakdown of existing communities and ecosystems that make survival difficult for species, unlinked open spaces increase the threat to wildlife.

Containment becomes a problem as access to fresh water is difficult to access and a monkey's home range is limited. The habitat is also vulnerable to invasion by alien species and the various effects of increased human contact. Fragmentation also results in increased interbreeding making a species weaker with each generation. The solution to the problem of habitat destruction is simple but difficult to implement and even more difficult to justify to authorities in light of the development requirements of an ever increasing human population. How does one justify land preservation for wildlife in an ecocentric state that is lacking in space for human requirements, like housing?

The eThekwini Municipality calls for balance in development and open space provision (Environmental Management Branch, 2002). But does this mean that equal portions of land are allocated to development and open space preservation? It is not sufficient for the Municipality to preserve a few of reserves within the unicity limits and claim that conservation is a priority. Evidence from the interviews demonstrated that the priority of the municipality and local government was first development and then conservation. Subisiso Thusi highlighted the political context under which decisions were made, around planning. In addition, an assessment of land-use change in Westville showed that the interviewees that did not think open space loss was highly significant in Westville, where all government employees. A case study presented in chapter two of this dissertation on Cougars in the United States, illustrated the role that economic, social and political factors play in the discourse of a problem animal. Ultimately, the actual welfare of that animal is disregarded as the debate surrounding it becomes more of a power struggle between stakeholders with different objectives and motivations.

Studies are therefore required to assess the amount of land required for total habitat preservation for all indigenous wildlife based on a meticulous open plan system in accordance with sound ecological principles which is currently ignored in the draft principles on the management of Vervet Monkeys (EKZNW, 2004). The conceptual structuring of open space presented in chapter three of this dissertation should be considered, using cores, corridors and buffers. Moreover, design principles such as minimum critical area and reserve shape and orientation should be considered.

Future development should be more cautious, following a precautionary principle, instead of demolishing tracts of land unsustainably. Even areas that are infested with invasive aliens can sometimes acts as corridors and habitats for wildlife. Finally, all categories of habitat should enjoy equal conservation status. Conservation does not refer solely to forest or woody areas as is noted by the categories of open space required for a functional ecosystem in the literature review. Natural terrestrial land cover should concentrate on grasslands in addition to forested areas.

7.4. Major Influences on Perception and Understanding of the Problem

The majority of interviewees felt that EIAs were ineffective in providing for indigenous wildlife and that there was a lack of follow-up exercises and monitoring. A review of the EIA guidelines (DEAT, 1998) showed a distinct lack of provision for wildlife, save the provisions for wildlife habitats and the International conventions to which South Africa is signatory, like CITIES. There was some provision for habitat conservation, but this was reserved for sensitive habitats and EIAs ignored attention to cumulative effects. There is a need for environmental assessment practices that take into account short and long term impacts of development. While it is understandable that providing for wildlife, like monkeys which are highly mobile, is difficult. An environmental assessment can at the very least acknowledge the presence of monkeys and provide for them by preserving sufficient habitat, with good corridor and buffer systems, and overall adhering to EESMP principles. There is also a great need for follow-up exercises and monitoring or, in the words of Nicky Armstrong (pers comm., 01/11/04), the EIA is "*not worth the paper it's written on.*"

Most interviewees complained about this aspect of an EIA. Sometimes developers or managers of land agree to certain conditions for the EIA to be passed, only to have the residents move onto a property and make their own changes, against the conditions under which the development was passed. The rules and regulations under which the EIA is passed have to be advised to new owners or managers of properties and have them adhere. In this way, the developers and authorities can not blame the property owners for changes in contrast to what was stipulated.

In addition, rules need to be laid out to complexes and individual properties within a conservancy as to what vegetation should be planted and what changes are allowed to development near an open space.

The majority of interviewees did feel that corridors would assist in alleviating the problem with Vervet Monkeys, for both residents and the monkeys. Respondents to questionnaires, when asked if they would be willing to modify aspects of their garden in order to alleviate the problem, also agreed that corridors would be an easy technique of drawing monkeys away from their homes. Residents were aware that corridors would not remove the nuisance of monkeys in gardens and homes, but would keep those that are more wary of humans away. Corridors would also allow monkeys access to other areas so they would not frequent one area.

In terms of danger to monkeys, a well established corridor system would allow monkeys greater mobility so that they are not confined to reserves and do not have to use the same treacherous paths that are used daily. In addition, as mention by Steve Smit, it would be harder for predators to track them if their whereabouts are unpredictable. It would also allow them access to water sources so they would not have to finds swimming pools and birdbaths in dry seasons. As seen in a review of the principles of island biogeography in chapter two, survival rates of species are higher overall in islands that are linked by corridors than those that are not. In addition, wildlife would have easy access to water and other resources. Escaping catastrophes would be easier and inter-breeding would be reduced so survival rates would be higher and off-spring genetically stronger.

Results from the assessment of the relationship between proximity to open space and actual monkey problems shows no correlation which confirms that monkeys are having to cross highly built urban areas, including roads to reach their desired destination. Monkeys would therefore have to cross roads less often then they presently do if there were a system of corridors. This will make them less threatened and motorists would be saved from having to swerve to avoid knocking monkeys on roads.

These proposed corridors should be well stocked with trees that provide edibles for the monkeys all year round, as an incentive to avoid residential hubs.

Feeding stations were rejected by the majority of interviewees who were in a position of wildlife management and often pinpointed a feeding station as the cause of a concentrated problem in an urban area.

And from a purely biological point of view, as reviewed in chapter two, the presence of feeding stations socialises monkeys to humans and makes them reliant on a regular food source. Baby monkeys go through a process of imprinting and in a scenario where they are being fed through a feeding station they imprint on the wrong food type. And when the food source is removed, the monkeys still concentrate in an area making them vulnerable to people who see them as a nuisance or threat and are prepared to harm or kill them to remove them from the area.

Feeding can be deemed acceptable if it not done on a regular basis, the food is placed at different areas within close proximity and the appropriate type of food for a proper monkey diet is used. The food should also be offered at different times of day. This method can be used to draw monkeys away from areas of high impacts like schools and clinics and can be a means of last resort when food is scarce and their survival is at stake. In addition, nature reserves, links and other open spaces should be well stocked with fruit trees to supply food to monkeys, which would assist in their survival without impacting negatively on them.

Education was considered one of the most important factors, by interviewees and residents who had the potential to influence opinions. Furthermore, an assessment of the relationship between level of education of residents and their perceived threat of monkeys shows that the higher the level of education, the less threatened the respondent felt. And although there was no correlation between members of environmental organisations and the perceived threat of monkeys, a calculation of the average perceived threat of members compared with non – members shows that members feel slightly less threatened than non – members.

Education also plays an important role in fostering respect in children and promoting futurity, as seen in the literature review. Considered as one of the most effective solutions, education has the power to decrease exaggerated fears and increase sympathy for the plight of a problem animal. This bodes well for educational initiatives as well as partnerships with environmental associations.

According the majority of interviewees, education could at the very least dispel wide scale myths that generally lends to negative judgment on monkeys. Education has the potential to be an essential component of the management plan of monkeys and indeed urban wildlife. It needs, however, to be more comprehensive and multi-faceted than just handing out pamphlets to urban resident listing the do's and don'ts were urban wildlife is concerned. This is not to say that these pamphlets are not useful is educating people, it is just not sufficient alone. Education should stem from various sources. Short term mitigation of impacts that arise from direct interactions between humans and monkeys can be alleviated by circulating pamphlets with advice for handling monkeys but they should also include more detailed explanations and advocate tolerance with understanding. By explaining the facts of issues like troop dynamics, rabies and even the threat of habitat destruction and the ensuing cause of the problem, more residents will be convinced than usual as they are nor just being told what to do but being made to understand. The laws against and penalties for injuring or killing wildlife should also be highlighted, along with channels for assistance.

Systems for long term education endeavours then need to be implemented. Tony Baker (pers. comm., 17/11/04) advocated the need for long – term partnerships with environmental associations and educational institutions which could foster more than tolerance, but respect for living all beings and the natural environment. Media reports could also be used to promote understanding and tolerance. The case study of Cougars in Santa Monica in chapter two showed how media reporting greatly influenced peoples perceptions and the Cougar discourse as whole. Similarly, emotive reporting on monkeys could influence perceptions and there is therefore a need for neutral factual reports.

Religion and spirituality was a contentious issue with both residents and interviewees. While just over half of the questionnaire respondents agreed that religion and spirituality did play an important role in shaping a person's perception of nature and monkeys, just under half of the interviewees agreed with this argument. Of these respondents, many believed that people who were religious or spiritual would have more respect for their natural surroundings, but accepted that this was not always that case. Others who did not believe that religion and spirituality played any role, maintained the point that ones opinions were due to their upbringing and that religion did not necessarily foster respect, which had to come from within. Surprisingly then, is the literature that exists on the topic of religion and spirituality which maintains that the most basic beliefs of humans are dictated by religion which is part of ones upbringing.

The role that religious organisations can play is therefore uncertain, but even a small role is still a role nevertheless. To change the way in which different religions view the environment and animals would involve going back centuries and rewriting history, and it might not matter as results show that it is more spirituality than religiousness that affects people's perceptions. But an attempt can be made to encourage individual organisations to advocate respect and tolerance. By working in partnership with individual churches, temples, mosques, synagogues and other religious organisations, people who visit these places of worship could be spiritually enlightened.

Humans continue to display great dualism where nature is concerned as they did in ancient times when nature was revered but simultaneously treated with irreverence. Literature shows time and time again the paradoxical need for closeness to open space for its spiritual and psychological benefits, but distaste for the animals that inhabit the area. The violent nature of humans when dealing with wildlife goes back centuries and although regulated and less common, the inflicted assault to monkeys living in close proximity to humans today translates to same behaviour. Similarly, humans greatly appreciate living near an open space or within a conservancy but are not affected by this proximity enough to appreciate nature or the wildlife within these spaces.

This is evident by that fact that residents were in unanimous agreement when asked if living within a conservancy or close proximity to a nature reserve held any personal value to them. But when asked if living in a conservancy or near an open space affected their perception of monkeys and nature, only thirty four percent of respondents agreed that it did while the majority felt that it had no affect on their perceptions.

This view was reinforced by the opinion of many of the interviewees who have encountered people that buy homes adjacent to the nature reserves in the Westville area and then proceed to modify their garden drastically, cutting down all indigenous trees and complain constantly about monkeys and other wildlife. Consultation is also needed between conservancy members, reserve managers, developers and potential purchasers of property, especially those that fall within the D'MOSS system, within a conservancy or in close proximity to a reserve. While it is impossible and impractical to conduct an EIA for every individual property, these areas could be subject to a screening process whereby vegetation stipulations could be made and the owners informed that they will be in close proximity to a reserve and to expect interaction with wildlife.

7.5. Responsibility

The lack of proper governance of monkeys is evident by the response from interviewees. When enquired who they thought should be responsible for the management of monkeys. Ezemvelo KZN Wildlife thought that the municipality, D'MOSS and City Engineers should play a more active role and that greater consultation with non – governmental organisations and CROW was needed. CROW thought that Ezemvelo KZN Wildlife should be held responsible for the monkeys as they were the custodians of wildlife as mandated by the public. The municipality thought that local government should be responsible, while Jean Senogles (pers. comm., 29/10/04) and Nicky Armstrong (pers. comm., 01/11/04) showed a lack of confidence in governmental departments where the management of monkeys was concerned. Residents were also unsure of the authority responsible for the monkeys with responses divided over local government, the municipality, the public and environmental associations.

It is therefore evident that a clear outline of roles and responsibilities is needed, before the problem of conflict between monkeys and humans can be solved. The draft policy for the management of Vervet Monkeys in KwaZulu-Natal does not clearly designate responsibility and different roles (EKZNW, 2004). There are different levels of management that are needed to deal with this problem.

Responsibility for legislation, management, rehabilitation, education and governance or assistance requires delineation. One body cannot assume all these responsibilities. The overriding governance should come from international, national and provincial legislation, while management should come from local government. Local government should be in consultation and partnership with relevant wildlife associations, and importantly developers and estate agents. Currently, the draft principles for the management of monkeys have not consulted with developers and although Thusi (pers. comm., 09/11/04) indicated that Ezemvelo KZN Wildlife did intend consulting with them in phase two of the project, this remains to be seen (EKZNW, 2004). Importantly, although legislation is dictated by international and national legislation, management regulations should be adapted and focused to the problem at a local context.

Rehabilitation is already dealt with in the policy guidelines on the management of Vervet Monkeys (Ezemvelo KZN Wildlife, 2004), but there needs to be more detail on the funding of rehabilitation centres as currently they are cash strapped and rely heavily on public donations. Education should be designated to a separate entity of advocacy drafted in partnership with specialists, environmental associations, educational institutions, and religious and community organisations. Assistance and governance on the ground should come from the municipality, and local government employees working within nature reserves, such as environmental managers and officers. Peter Brigg (pers. comm., 01/02/05) described having success with an "*aggressive education approach*" implemented by their environmental officer.

7.6. Potential Solutions

It is evident from the results presented in the previous chapter and the discussion in this, that there is not simple or single solution. A combination of solutions to both short term and long term problems are required, which will essentially solve different problems. The immediate threat of monkeys, as perceived by residents can be alleviated through various methods described earlier, including concealment of edibles, planting of fruit trees, encouraging corridors and so on. Education can also be widely utilised to reduce the hysteria surrounding the threat of monkeys and their associated behaviour and diseases. Education can also be used effectively as a tool to promote respect for wildlife and monkeys in particular by various partnerships and dissemination methods.

Tools that are utilised for the mitigation of impacts from development and adherence to sustainable development principles need to be used more effectively and stringently. EIAs for example need to more rigorous, allowing for the assessment of long term impacts, cumulative effects and all habitat conservation. They should also encourage interaction between developers and owners of property to adhere to conditions under which some EIAs were passed, especially in close proximity to open spaces. Ultimately, tools like EIAs and the EESMP should consider the welfare of indigenous wildlife.

Despite the wide support for education as the major solution to the problem, not all humans are willing to be educated or to change their ways, and we need to ask ourselves, does a problem have to reach this type of intensity before authorities to do something. And as the old saying goes, prevention not better than cure. The solution isn't any easier for the problem in its entirety compared to the short term problem. Urbanisation figures presented in the literature review of this dissertation estimate a figure of over eight billion people living in urban centres around the world by the year 2030. And future cities will have high densities and resource consumption and the space require to house the future urban population is almost unfathomable.

If, as expected, the interactions between humans and monkeys continue indefinitely, and options like culling and relocation take precedence, there soon will not be any space left for relocation or worse, will not be any monkeys left. Literature on solutions like relocation and sterilisation reiterate the unsustainability of such methods, as they do not address the actual problem. Therefore one important consideration is the conservation of habitat. As explained above, taking into consideration rigorous and sound ecological planning and reserving space for wildlife could alleviate the problem.

Assuming preserved areas can mimic a natural habitat as close as possible with buffers and corridors, monkeys might be inclined to stay away from danger or because of the decreased visibility and interaction, the problem will be perceived as less intense. In this way, long term solutions should be a priority.

7.7. Conclusion

This chapter sought to present a discussion of the results of this dissertation in an integrated and meaningful form. A discussion of the nature of the problem with Vervet Monkeys shows that the complaints from residents of the Westville are mostly superficial, with a few exceptions. The effects of the "mischievousness" of monkeys can be alleviated with simple deterrent methods, while the actual threats require more long term solutions. It was also found that a decrease in open space led to increased interaction between humans and monkeys which led to a perception of an increased problem. Possible influences on the problem were education, partnerships and stricter legislation. Importantly, there was a need for roles and responsibilities for the management of monkeys to be specified and long term solutions to be developed for habitat preservation for all wildlife. The final chapter of this dissertation will assess if the aims and objective specified in the introduction, have been met and seeks to provide informed recommendations to the problem.

CHAPTER EIGHT
CONCLUSION AND RECOMMENDATIONS

8.1. Introduction

The data assimilated from an extensive collection process has resulted in a plethora of information, both valuable and interesting. From this lengthy process carried out over the better part of three years, what can be learned about the problem between humans and Vervet Monkeys? What can be recommended that has not been suggested before? Moreover, have the study's aims and objectives been met? These questions will be addressed in this final chapter leading to offering salient proposals that could inform future decision making on monkeys and urban wildlife in an expanding urban environment.

8.2. Aims and Objectives

The aim of this research process was "to assess the nature and extent of the *monkey problem* in the former Westville Borough"

The nature of the problem of Vervet Monkeys in the former Westville Borough can be best described as more perceived than real. The majority of the complaints relating to monkeys, as substantiated by residents, interviewees and newspaper articles, described monkeys as a nuisance rather than a threat to their well-being. Those that did experience feelings of fear of monkeys related these feelings to behaviour that was atypical of monkeys. These fears were therefore mostly unfounded and could be resolved through education and understanding. The reality however, is that some people are not open to change and not willing to adapt and tolerate. There is therefore a need for long term solutions to alleviate the problem in the future and avoid situations of conflict as much as possible.

The extent of the problem of Vervet Monkeys in the former Westville can be described as widespread and frequent. The majority of residents indicated daily to weekly visits from anywhere between one and twenty monkeys.

The problem is consistent throughout the year but slightly increased in winter and times of scarce food and water supply. In addition, there is no reason to believe that the problems are confined to residences around open space. A finding of an assessment of the relationship between the actual problem and distance from open space yielded no correlations. It instead showed problems of equal extent between residences close to the nature reserves and those over 1.5 kilometres away from the nearest open space. Monkeys are therefore traversing across roads and other hazards to reach their desired destination, as there is no well developed corridor system.

The objectives of the study were:

- To categorise and quantify land-use changes (1974 – 2000)

Land use changes in the former Westville Borough were classified into three categories, forest and woody areas, natural grassland and recreational. The remaining land uses were left as default. An assessment of the change in provision of land allocated to these categories between the years 1974 and 2000 showed an overall decrease of over fifteen percent in open space. Forest and woody areas and natural grassland decreased by nine percent and six percent respectively. Furthermore, the size of isolated pockets of natural grassland dropped so that those remaining pockets were small and highly incapable of sustaining a thriving ecosystem considering the external disturbance in close proximity.

- To profile the frequency and nature of complaints

As mentioned above, the frequency of complaints fell mostly between daily and weekly. The nature of complaints ranged from a description of monkeys as nuisances, stealing food from gardens and homes and creating mess and disturbance, to feelings of fear of monkeys.

- To assess, if any, the association between land-use changes and incidence of monkey complaints

It was difficult to assess the immediate or direct impact of land-use change and the incidence of monkey complaints due to the lack of regular sets of orthographic photographs. The likely result is, however, that with the decrease in open space the monkeys are more visible and interactions are greater. There is therefore a perception that the problem has increased as the number of monkeys have increased, but this is unlikely, as a record of troop numbers by Jean Senogles (pers. comm., 29/10/04) showed a decrease in number. Moreover, the modified habitat that monkeys now inhabit is considered by experts (Butler pers. comm., 01/11/05; Thusi pers. comm., 09/11/04) as optimal. The natural grassland which is the natural foraging area for monkeys, has been modified to forest and woody areas, making monkeys more likely to access residents homes for food as their natural habitat is on the boundary of residential properties. In other words, the natural buffers between humans and wildlife have been eradicated. The effect of land use change can therefore be described as easier access for monkeys to homes and increased interaction due to proximity which is misconstrued as an increased problem.

- To examine Durban's EIA, MOSS process and establish if provisions for indigenous fauna exist

An examination of Durban's EIA process bluntly illustrated the lack of provision in terms of protection and legislation for monkeys and wildlife in general. Although the EIA process aims to mitigate impacts that development might have on the natural environment, it often fails to consider future or long term impacts and the does not at all cater specifically for wildlife. It does not include provision for open space unless the area is of high sensitivity or is home to an endangered species. It does not take into account cumulative effects. So in some cases, the individual development could be perfectly sustainable but combined with the numerous other pieces of development occurring in close proximity, the overall effect of habitat destruction is devastating. Follow-up exercises and monitoring are not implanted either.

The Durban Metropolitan Open Space System, now known as the eThekwini Environmental Services Management Plan, although rigorous in theory, has failed to secure sufficient tracts of open space for the livelihood for wildlife and therefore to avoid such confrontations as those between monkeys and humans.

8.3. Recommendations

The following recommendations based on the findings of this dissertation are presented under "short term goals" and "long term goals." The purpose of the short term goals is to alleviate the conflict between humans and monkeys in the interim while the long term goals can be initiated to change the nature of the problem and hopefully decrease interaction altogether.

8.3.1. Short Term Goals

Education

- To put in place an education and awareness programme to inform residents of the finer aspects of the behaviour of monkeys, thereby dispelling myths associated with their behaviour and decreasing antagonism. The process should include information on aspects of troop behaviour, inter-troop conflict and the likely reaction of monkeys when threatened or cornered by humans.

- To inform residents of their options when in a compromising or frustrating situation with monkeys and importantly the penalties if they decide to take matters into their own hands and injure or kill the monkey. Residents should be encouraged to alert authorities to people who are responsible for causing harm to wildlife, with the option of remaining anonymous if they prefer to do so. Contact details of people who could assist in this respect should be clearly highlighted.

- To increase awareness efforts in winter and times of scarce food and water supply, like during periods of drought.

Media

- To use media reporting as a vehicle for awareness and education to residents in an urban area. Local newspapers such as the *Highway Mail* could be used to disseminate information detailed above, such as contact details, aspects of inter – troop conflicts and potential solutions to specific problems like the intrusion of monkeys into homes and causing damage.

8.3.2. Long Term Goals

Legislation:

- To review the status of the Vervet Monkey both at a national and international level. At a national level the term *vermin* should be removed from modern legislation as it is no longer justified. The Vervet Monkey should be awarded protection worthy to that of an indigenous animal. Vervet Monkeys should be removed from appendix II of CITES and re-categorised under appendix I to endangered wildlife.

- To formulate laws for the protection of indigenous flora on properties adjacent to demarcated open space. It is not sufficient for the municipality to slowly secure the land before changes are made. If owners are obliged to protect and preserve certain flora or have regulations as to what flora can be planted, effective corridors and buffers can be cultivated around reserves.

- To review the rules and regulations of Environmental Impact Assessments, so that provision can be made specifically for the protection of indigenous wildlife during and after development. Provisions should be made for greater habitat protection and for the assessment of cumulative effects. "No go" options should be exercised more regularly to limit unsustainable development and curb the unyielding process of urbanisation. In addition, to set limits to development and set aside a balanced portion of land as wildlife habitat. And to legislate monitoring and follow – up exercises.

- To review of the principles that inform the Environmental Management Services Plan and assess if these principles are being considered in open space planning. The demarcation and management of open space needs to be more rigorous and informed by sound ecological principles.

- To reinstate the ban on discharging of pellet guns in a residential area.

Education

- To encourage and form partnerships between educational institutions, wildlife authorities and environmental organisations and find methods of information dissemination. This should be done with the purpose of advocating respect for wildlife in the hope that this would ultimately change attitudes and perceptions.

- To encourage partnerships with religious groups to educate followers on respect and appreciation for the environment and wildlife within.

Roles and Responsibilities

- To clearly and unequivocally designate roles and responsibilities. There needs to be a clearly defined structure which specifies the provincial and local wildlife authorities, the authorised rehabilitation centres and the "on the ground" environmental managers and officers responsible for complaints. There is also a need for education and media reporting to be delegated to a committee or organisation.

- To encourage environmental managers to work with developers, local open space planners and managers as well as residential committees and conservancies when formulating and reviewing regulations for the management of Vervet Monkeys.

Habitat Preservation

- To balance the need for development and open space provision. Currently, the scales are tilted in favour of development, which is seen as progress. Habitat preservation should be viewed as an indicator of a thriving society instead of a burden. Habitat can also be secured by rehabilitating un-developable or spoilt land. Corridors and buffers should be planned for prior to development. Habitat preservation should focus on a variety of habitats like grasslands, not just forest and woody areas. The preserved habitat should mimic the original habitat as close as possible.

- Troop monitoring is required to assess the impact of habitat destruction and human contact on troop numbers, to verify that numbers are not increasing but the problem is actually due to increased contact.

8.4. Conclusion

This concluding chapter aimed to respond to the aims and objectives specified in the introductory chapter of this dissertation. The nature of the problem was described as more perceived than real and the extent was vast and incidents frequent.

To answer the question asked at the beginning of this chapter, what can be learned from this dissertation, the answer would be to:

1. Put into effect a rigorous and tiered campaign to educate residents and dispel myths

2. To lobby for the modification of legislation, to preserve open space using sound ecological principles, and

3. To clearly designate roles and responsibilities for the management of urban monkeys and wildlife.

Education and the media can be used in the interim to educate residents on the problem in a short term context, but to change people's perceptions and attitudes, long term solutions are needed. Likewise, the mitigation of the nuisance of monkeys can be alleviated with simple solutions but to change the nature of the problem and decrease interaction, there is a dire need of a change in legislation and that way in which nature is viewed by planners, developers and governmental authorities. Two interesting quotes cane out of the interview process and they are appropriate here to sum up the plight of problem animals.

Jean Senogles (pers. comm., 29/10/04) mentioned of human actions against other living species, "*As Professor Piper* [founder of Palmiet Nature Reserve] *says as far he knows in the 55 million years that monkeys have been around they have never sent anything to extinction and we are sending things to extinction to the tune of 10 or 11 species a day.*"

Tony Baker's (pers. comm., 17/11/04) thoughts came from the observation that 200 years ago "*the same problems were with leopards and lions and they actually exterminated all these animals because a leopard killed a teacher at Leopard's Rock.*" He therefore asks the question "*are we going to wait for all monkeys to be exterminated and develop environmental sensitivity once it's too late or do we get our act together and use whatever resources we have to understand the problem?*"

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List of Interviewees: See Appendix 5.2.

APPENDIX 3.1

FUNCTIONS / INTEREST ISSUES OF THE BIODIVERSITY WORKING FORUM

- Climate change
- Conservation planning
- Implementation tools
- Management best practice
- Invasive organisms
- Development assessment and impacts (Large EIA's)
- Policy and legal (GMO's incl.)
- Strategy
- Sustainable utilization
- Economic benefits of biodiversity
- Equitable access to resources
- Monitoring and enforcement

APPENDIX 3.2

DRAFT FOR SUBMISSION 28 FEBRUARY 2004

POLICY FOR RESCUED, CAPTIVE, CONFISCATED & PROBLEM VERVET MONKEY MANAGEMENT IN KWAZULU-NATAL

The objectives of this policy are:

- To set a standard and uniform approach to the management of orphaned vervet monkeys, dealing with problem vervet monkeys, care of captive vervet monkeys and the control of rehabilitation efforts in KwaZulu-Natal
- To ensure that legislation is consistently and rigidly applied, effectively co-ordinated and regulated to prevent unethical and illegal practices
- To safeguard against genetic contamination of wild animal populations through inappropriate introductions into the wild
- To prevent trade in vervet monkeys, and discourage their removal from their natural habitats
- To curtail the occurrence of practices that lead to the cruelty or abuse of vervet monkeys, and ensure that the welfare of the animal remains of primary importance
- To encourage a spirit of transparency and accountability amongst organisations dealing with vervet monkeys, and to ensure that they operate professionally.
- To discourage the perception of vervet monkeys as problem animals, and promote ways of minimising conflict between vervet monkeys and other land users (farmers, rural and urban human inhabitants
- To promote research required to obtain factual information on which the management policies of vervets can be based.

Ezemvelo KZN Wildlife UNDERTAKES to:

Increasing knowledge/ status

1. Encourage and facilitate research aimed at elucidating conservation status, population estimates and dynamics, auto ecological studies and assessment of threat.
2. Support and encourage genetic and behavioural studies to inform decision-making with regard to translocation and release criteria.
3. Promote the collection of genetic and ecological information from management efforts (i.e. genetic material from confiscated, rescued animals, distribution registers, etc)
4. Encourage and facilitate research aimed at assessing population dynamics and behavioral changes of urban vervet monkeys, including when habitats are lost, behavioroul modification to adapt to urban setting while reducing conflict with humans.

Prevention of problem animal issues

5. Facilitate and promote public awareness, and educate people
6. Advise on and promote asset protection and damage reduction approaches
7. Encourage and create the capacity amongst interested and affected parties to responsibly and proactively and collaboratively resolve conflicts with problem vervet monkeys

8. Encourage investigation of the feasibility and appropriateness of strategies to deal with to urban monkey problems, such as environmentally friendly town planning, urban garden management, and proposed artificial feeding of monkeys, and the implementation of successful methods.
9. Prevent and take action against poisoning and inhumane disposal / destruction of vervet monkeys, both of which are illegal activities.
10. Facilitate the humane trapping and appropriate removal of those monkeys (troops) identified as being problem animals

Dealing with orphaned, injured, misplaced or confiscated animals

11. Ensure that orphaned, injured, misplaced or confiscated animals are humanely dealt with, according to *IUCN Guidelines for the Placement of Confiscated Animals,* and the *IUCN Guidelines for Re-introductions.* Facilitate alignment of this policy amongst other agencies and organisations with responsibility (e.g. municipalities)
12. Set standard and uniform approaches to the control of rehabilitation efforts in KwaZulu-Natal, the care of captive vervet monkeys, and humane euthanasia where all other options are not available. (see below)

Keeping of vervet monkeys in captivity

13. Ensure that the keeping in captivity of vervet monkeys is minimized, and the removal of live vervet monkeys from the wild is strongly prohibited
14. Ensure that any keeping of vervet monkeys in captivity conforms to the highest standards of animal husbandry, including naturalized environment, environment enrichment, and guaranteed financial security and sustainability
15. Allow (register) and support sanctuaries only where there is guaranteed sustainability (financial, legal), and where caged environment is of such a standard to maintain quality of life and promote emotional and physical welfare of individual animals.
16. Register all Centres (facilities) for keeping of captive vervet monkeys (including sanctuaries, rehabilitation centers, satellite rehabilitation centers, research and education facilities), using criteria (animal welfare, purpose), and set and limit the capacity of each Centre
17. Develop a Code of Conduct, and set operating procedures and standards, for Sanctuaries and other Centers for captivity (rehabilitation, research and education). Registration of a legitimate center will depend on compliance of the Code of Conduct and operating procedures and standards.
18. Implement a permit system for Sanctuaries and other Centres (facilities) for keeping of captive, that stipulates conditions and criteria
19. Require each Centre to submit and adhere to a Management Plan approved by EKZNW, including the keeping of detailed daily records. Centres must be inspected on a regular basis eg. 6 monthly and without prior notice.
20. Ensure euthanasia of animals if animal welfare is compromised
21. Ensure euthanasia if the number of animals exceeds limit permitted for the specific Centre, no other suitable facility is available, and animal welfare is being compromised.
22. Ensure that conditions in which animals are kept for research or experimental purposes conform to a standard of caging conditions that promote emotional and physical welfare of individual animals, and conform to international best practice. If animals are to be used for research, then their welfare (physical and psychological) must not be compromised.

Rehabilitation

23. Develop specific rules/guidelines for Rehabilitation of Vervet Monkeys in KZN
24. Appoint a Rehabilitation Council/Committee to oversee activities and set guidelines
25. Support rehabilitation only if it complies with IUCN guidelines (above), especially with regard to genetic issues (conservation) and animal welfare
26. Prevent genetic contamination of wild animal populations through inappropriate introductions into the wild
27. Prevent the possible spread of disease amongst established wild animal communities through inappropriate introductions

28. Register Rehabilitation Centres (longer-term centers that implement rehabilitation) and Satellite Rehabilitation Centres (short-term holding and stabilisation). Develop criteria and conditions for each of these care centers.
29. Develop a Code of Conduct, and set operating procedures and standards, for Rehabilitation Centres and Satellite Rehabilitation Stations
30. Implement an effective permit system for Rehabilitation, which stipulates conditions and criteria. There must be separate permits for captivity, translocation and release.
31. Require each Center to submit and adhere to an approved Management Plan, including the keeping of detailed records. Centres must be inspected on a regular basis eg. 6 monthly and without prior notice.
32. Rehabilitation and release must be conducted as part of a structured scientifically valid programme, that includes monitoring and reporting.
33. Require independent evidence of successful rehabilitation efforts within stipulated time period. This includes appropriate site selection, monitoring of release, follow-up. Continued permission to operate as a rehabilitation center will be contingent on provision of evidence of rehabilitation success.
34. Withdraw permit and deregister RCs and SRSs which do not demonstrate successful return to the wild
35. Ensure humane euthanasia of animals if animal welfare compromised (injured), or if the number of animals in the Centre exceeds permitted and no other suitable facility is available and animal welfare is being compromised, or if an animal is deemed not rehabilitatable (humanized, imprinted, permanently disabled) and a approved sanctuary facility is not available
36. Identify and eradicate illegal practices parading as legitimate Centres
37. Require RCs and SRSs to operate in a spirit of transparency and accountability, and most importantly to operate professionally
38. Require and encourage the involvement of veterinarians in the development of guidelines, inspection and care of the animals

Medical research captivity

39. Prevent the use of wild-caught animals or confiscated animals for medical research, and discourage the number of animals used for this purpose
40. Ensure that any keeping of animals in captivity for medical research (all types, including behavioural and invasive or experimental) is screened by an Ethics Committee on which the SPCA and EKZNW is represented, and that a regular inspection schedule is implemented.
41. Ensure that the special needs of this primate species are provided for if kept in captivity. Conditions of captivity (cage size and design, environmental enrichment, and monitoring and inspection) must comply with international best practice, and provide for social and psychological needs. This should apply during all periods of captivity, including quarantine facilities, holding areas and experimental areas.
42. Minimise the number of animals used for medical research, and ensure that the time kept in captivity for each animal is minimised.

Euthanasia

43. Ensure that where a monkey is injured beyond recovery to a healthy state (maimed), where no suitable facility for housing in captivity exists (sanctuary), and where rehabilitation is not an option (some problem animals, no appropriate facility or habitat), such animals are humanely euthanased without delay.

Definitions for Vervet Monkey Policy:

Animals – vervet monkeys

Captivity – when a member of the public or an organisation/agency or any facility has a monkey in his/its possession either caged or semi-caged or tame.

Confiscate – to remove vervet monkeys from the hands of the public. Confiscation is the ability and function of the relevant authorities to prevent animals being kept without the relevant permit. Animals need to be confiscated if held illegally or kept in inhumane conditions, bearing in mind that stress includes physical and emotional aspects or the unability of an animal to have quality of life. A clearly defined process must be followed before confiscation so that unnecessary confiscation can be avoided

Education centres: Animals are kept in captivity for the purposes of exhibiting them to the public. The objective must not be commercial gain, but rather non profit organisations which rely on income generated for their continued operation. Centres include zoological gardens

Problem animals – vervets that due to anthropogenic causes have become a problem. Proof that a monkey is a problem is important. *'A "problem animal" is an individual animal or few individuals that either causes an economic loss (e.g. crop or stock damage or damage to property) or is a real threat or nuisance to man.*

Sanctuary – a place where monkeys live in suitable conditions in captivity. A registered, permitted, economically viable entity for the sole purpose of caring for animals that cannot successfully live in the wild. Suitable candidates for sanctuaries are: highly humanised, old and frail monkeys, blind monkeys, monkeys injured in such a manner that they can live a good life even though they cannot be released to the wild.

Satellite Rehabilitation Centres - a permitted, local, economically viable entity for the purpose of caring for animals, temporarily, and stabalising them until they can be moved to a registered Rehabilitation Centre. (Must comply with the Rehabilitation Centre's definiton)

Registration of centres – registration of Centres, requiring a permit, adherence to guidelines and policies, and approved Management Plan and regular inspection. Centres that are not registered will not be issued permits to keep animals in captivity for any purpose whatsoever.

Rehabilitation Centre: A centre where Injured or ailing or orphaned animals are kept for the sole purpose of rehabilitating (restoring) that animal to healthy state and returning them to the wild Animals should be returned to their natural environment where they can survive the elements and effectively re-enter the social hierarchy of that species. Such animals should be able to fend for itself, forage on its own, be healthy and disease free and independent of human assistance for survival

Rehabilitation is defined as the treatment and temporary care of injured, orphaned, and misplaced wildlife with the primary aim being the subsequent return of healthy viable troops of animals to appropriate habitats in the wild. Rehabilitation can also involve the placement and preparation for placement, of suitable non-rehabilitatable animals into registered educational programs *and registered and approved sanctuaries.* There must be humane euthanasia of non-rehabilitatable, non-placeable, or

severely disabled animals. An animal is suitable for rehabilitation if, according to a sympathetic vet, it is able to recover to such an extent that the animal can forage independently and effectively and is able to keep up with a troop as it moves. If it is unable to do so, a sanctuary home must be found within 1 month, that can accommodate such an animal and if this fails, it should be euthanased.

APPENDIX 5.1

QUESTIONNAIRE

Name (optional): _____ **Date**: _____

SECTION 1: NATURE OF MONKEY PROBLEM

1.1. What is the nature of the monkey complaints in the Westville area?

_____

_____

_____

1.2. Do you perceive monkeys in this area as a threat to ones well being?

_____

1.3. How often do monkeys visit your property? _____

1.4. How many monkeys on average visit your property? _____

1.5. Do they carry any young? If yes, approximately how many? _____

1.6. Are their visits seasonal (i.e. increased in winter/drought)? _____

1.7. In your opinion, has the problem increased in the last few decades (i.e. in the last 20 to 30 years)?

_____

1.8. Have open spaces increased, decreased or remained the same around your property? Explain

_____

1.9. How has this affected the number of monkeys and frequency of their visits to your property?

_____

1.10. How does the conflict between humans and monkeys affect the monkeys?

_____

_____

SECTION 2: PERCEPTION OF MONKEY PROBLEM

2.1. Has living in a conservancy or near an open space affected your perception of monkeys? Explain

_____

_____

2.2. Who, in your opinion is responsible for these monkeys?

_____

_____

2.3. Do awareness and education programmes influence ones opinion of monkeys and wildlife in urban areas?

_____

_____

2.4. Does your religion, spiritual following or upbringing affect your perception of monkeys, wildlife and nature?

_____

2.5. Does living in close proximity to an open space or conservancy hold any personal value to you?

_____

2.6. Given that urbanisation is increasing at such a drastic rate, what would you advise as a solution to the problem between humans and monkeys?

_____

_____

2.7. Would you modify aspects of your garden and verge if you though it might help decrease the problem (i.e. changing the types of plants and tress, encouraging corridors)?

_____

SECTION 3: DEMOGRAPHICS

3.1. Address: _____

3.2. How long have you lived at this residence? _____

3.3. Age: _____ 3.4. Gender (optional): _____

3.5. Level of Education (tick one):

Primary		Secondary		Tertiary		Post Graduate		Other (Please specify)	

3.6. Are you a member of any Conservancy Group, Environmental Association etc?

SECTION 4: SITE/GARDEN EVALUATION (Please provide basic information if you live in Westville)

4.1. How large is your garden? _____

4.2. What percent is indigenous and what percent is alien or invasive alien?

4.3. Do you have fruit trees? Please specify

APPENDIX 5.3

INTERVIEW QUESTIONS

1. What is the nature of monkey problem in the Westville area?
2. Are monkeys a threat to people living in the area?
3. Are humans a threat to monkeys in an urban environment?
4. What, in your opinion is the cause of the monkey problem?
5. Has the problem increased/decreased/ over the last few decades (20-30 years)?
6. How has the land-use structure of Westville changed over the same period?
7. Have the land-use changes in and around the area had any effect on the monkey problem?
8. Is the problem seasonal or consistent (i.e. all year round/drought periods and winter)?
9. Whose responsibility is it to deal the monkey problem?
10. Have Environmental Impact Assessments in the area played any role in foreseeing or mitigating the problem?
11. How do corridors affect the migration of monkeys and does this affect the interaction with humans?
12. What affect do feeding stations have on the monkey problem?
13. Does education & awareness have any affect on resident's perceptions of monkeys and the monkey problem?
14. Does spirituality & religion have any affect on resident's perceptions of monkeys and the monkey problem?
15. Does living in close proximity to an open space or conservancy influence ones perception of monkeys and the monkey problem?
16. What solutions do you propose for the problem (especially considering rate of urbanisation and urban sprawl)?

Additional Comments?

APPENDIX 5.4

FORMULA FOR AREA CALCULATION WITH GIS

The following statement in Pre-Logic VBA Script Code box:

```
Dim dblArea as double
Dim pArea as IArea
Set pArea = [shape]
dblArea = pArea.area
```

The following variable was used under the field name:

dblArea

APPENDIX 5.5

CROW ADMISSION FORM FOR INJURED ANIMALS

		No:

CENTRE FOR REHABILITATION OF WILDLIFE
ADMISSION FORM

Dear Wildlife Friend, Thank you for finding the time to bring your patient to us. We will care for it to the best of our ability, and when it is well, it will be released back into its environment of wherever it will be most safe.

PLEASE COMPLETE THE FOLLOWING

Date:
Name:
Address:
Contact No:
Type of Animal:
Area found:
Date and Time found:
If possible, please tell us what happened to your patient:
Have you treated your patient (e.g. given it something to eat or drink)?:

I hereby relinquish any rights of custody of the above animal and I entrust this admission to CROW's care **SIGNATURE**_____

P.S. A small donation will be gratefully received. This will help towards the care of your patient. **DONATION**_____

FOR CLINIC USE ONLY

Treatable : YES / NO	Rescue : YES / NO
Admission Time :	
Admitting Person :	
Species / Common Name :	
Age :	Infant / Juvenile / Sub Adult / Adult
Sex :	Male / Female / Unknown
History :	
Initial Diagnosis :	

Initial Treatment :
Accommodated :